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OF
Arts and Sciences;
CONTAINING
FULL DESCRIPTIONS OF THE PRINCIPLES AND DETAILS OF
EVERY NEW PATENT,
ALSO
Original Communications
ON SUBJECTS CONNECTED WITH
SCIENCE AND PHILOSOPHY,
PARTICULARLY SUCH AS EMBRACE THE MOST RECENT
INVENTIONS AND DISCOVERIES
IN
Practical Mechanics.

BY W. NEWTON,
CIVIL ENGINEER AND MECHANICAL DRAFTSMAN,
Assisted by several Scientific Gentlemen.

VOL. VII.
[SECOND SERIES.]

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[SECOND SERIES.]

Original Communications.

Art. I.—Proposed Plan for Supplying the City of London and its environs with pure Water from the River Thames.

This subject having lately excited considerable interest both in Parliament and among the inhabitants of the Metropolis, we feel great pleasure in laying before our readers a very simple plan for supplying London from the Thames with filtered water in a pure state, and which appears to be perfectly practicable, and capable of being carried into effect by any of the existing Water Companies, at a small expense compared to the execution of any of the projects which have been recently laid before the public, of bringing water to London from a distance.

The present is the suggestion of Mr. Lemuel Wellman Wright, whose highly ingenious mechanical inventions have so often enriched the pages of our Journal. This plan was brought before the Royal Society a few evenings ago, at the express desire of his Royal Highness the President. The following is the substance of Mr. Wright's paper read upon that occasion:—

Having perused with great attention the several Reports of the Commissioners appointed by his late Majesty, and the Committee appointed by the honourable the House of Commons, to inquire into the state of the water supplied to the metropolis and its suburbs, it does not appear by such reports that there are any modes pointed out by the various parties who suggested plans for the supply of pure water, which met the views or wishes of either the commissioners or the committee; but the committee state, that after examining the numerous plans and suggestions, they are convinced, that it is practicable to supply water by filtration from the Thames, which would be the most efficacious mode of securing the public from the effects of the nauseous and deleterious ingredients, with which the supply of that useful and necessary commodity is impregnated.

Much talent has been exerted, and great expense incurred by individuals, to shew that new establishments are requisite at great expense, to bring water to London from a distance; but even allowing the water were brought from such distance, it would become foul, and but little better than the Thames; and the difficulties which occur in any attempt of the kind, are, to prevent the outlay of more capital than it would be competent to any parties to spend, whether in existence as companies, or to companies hereafter to be formed; to invade as little as possible the tenure of private property to the injury of its possessors;

and to make available, as far as may be, the present mains and pipes, as they are now laid down, so as to avoid the necessity of obstructing the pavements by being compelled to lay down others.

It being stated in the reports, that the supplies of all the water companies in the metropolis and its suburbs are taken from the river Thames, except the New River Company and the East London, which latter company is supplied from the river Lea, and that a partial supply of the New River Company during the summer season, is also taken from the Thames, at an establishment formed at Broken Wharf, Upper Thames Street, I feel less difficulty in coming to the conclusion, that a filter may be formed under the bed of the Thames itself for each company, competent to furnish a quantity of water equal to the consumption of the metropolis and its suburbs, and in every respect more pure than filtration can make it generally, in consequence of the great depth at which the filtering bed may be made, as will be shown hereafter.

The following is an extract from the Report of the commissioners appointed by his late Majesty, as before stated, on this important subject:—

"To obtain an effectual supply of clear water, free "from insects and all suspended matters, we have taken "into consideration various plans for filtering the river "water, through beds of sand and other materials; and "considering this on many accounts as a very important "object, we are glad to find that it is perfectly possible "to filter the whole supply, and this within such limits in "point of expense, as that no serious objection can be "urged against the plan on that score, and with such "rapidity as not to interfere with the regularity of "service."

And in a subsequent part of such report, the com-

missioners quote Dr. Bostock's opinion in the following words:—

"It appears that the water of the Thames, when free "from extraneous substances, is in a state of considerable "purity, containing only a moderate quantity of saline "contents, and those of a kind which cannot be supposed "to render it unfit for domestic purposes, or to be in- "jurious to the health; but as it approaches the metro- "polis, it becomes loaded with a quantity of filth, which "renders it disgusting to the senses, and improper to be "employed in the preparation of food. The greatest "part of this additional matter appears to be only "mechanically suspended in it, and separated by mere "rest; it requires, however, a considerable length of "time to allow of the complete separation; while, on "account of its peculiar texture and comminuted state, "it is disposed to be again diffused through the water, by "a slight degree of agitation, while the gradual accumu- "lation of this matter in the reservoirs, must obviously "increase the unpleasant odour and flavour of the water, "and promote its tendency to the putrid state.

"Regarding the greatest part of the extraneous matter "in the Thames, as mechanically mixed with it, we may "conceive that a variety of incidental circumstances will "affect its quantity in the same situation, and under the "same circumstances of the tide; but the observations "are sufficiently uniform to warrant us in concluding that "the water is in the purest state at low tide, and the most "loaded with extraneous matter at half ebb. It would "appear, however, that a considerable part, if not the "whole of this extraneous matter, may be removed by "filtration through sand, and still more effectually by a "mixture of sand and charcoal."

A consideration of these facts, and of the most simple

method of obtaining a supply of pure water, has led to the following mode of carrying such an object into effect, which it is hoped will appear clear and easy, certain of success, not interfering with the navigation of the Thames, not throwing into disuse the expensive engines, pumping machinery, and supply pipes already in place for use, not too expensive, or otherwise objectionable for existing companies to avail themselves of, and perfectly within the reach (at a moderate outlay) of any new companies, for the supply of pure water, which may be formed hereafter.

The following observations will, it is hoped, lead progressively to a development of the natural mode of filtering water, and shew how and at what probable expense, this mode may be adapted to general use, without any of the disadvantages noticed above.

The wells on both sides of the river Thames, within a certain distance, it is well known, are affected by the rise and fall of the tide, which fact proves that such wells derive a supply by filtration from the river.

I believe it is generally admitted that these wells give a supply of water wholly untainted with animal or vegetable matter, and evidence was given before the committee, that the water of the Thames, when filtered, is particularly wholesome, and the wells of water in its neighbourhood being pure, proves the efficacy of the filtration; and it being found that this water does filter through the surrounding soil, at a rate which, although unknown, must be very considerable (because it affects wells at a distance of many hundred yards) it must follow, that there can be no great difficulty in obtaining a similar supply, by means of a filter constructed on the same natural principles, under the bed of the river itself.

The deposit of mud on the sides of the river Thames, does not reach beyond the low water mark, and the bed

of the river throughout is generally a clean and strong, though porous gravel.

The deposit of mud, therefore, will puddle in, and close the pores of the gravelly bed on which it lies, above the low water mark, so that the filtration into the neighbouring wells must take place below low water mark. It is therefore proposed to construct a filtering chamber below the bed of the river, from which a main pipe or tunnel will conduct the filtered water into a well on the river side, which may be taken from thence by the present steam power on shore, and delivered out by the mains and branches now laid down by the existing water companies.

The drawing accompanying this paper (see Plate I.) exhibits this mode of operation, in a state of completion, and the means by which it is to be accomplished, are now to be more fully detailed.

Fig. 1, is a vertical section of a portion of the river, shewing the proposed filtering bed, the supply pipe, the well, and the engine house. Fig. 2, is a plan or horizontal representation of the floor of the filtering bed, the conducting pipe and the section of the well. The line *a, a,* is the level of the river at high water; the line *b, b,* its level at low water; *c,* is the filtering bed, composed of materials as described below; *d,* is the filtering chamber, or receptacle for the water, when it has percolated through the bed; *e,* the pipe which conducts the pure water; *f,* the well in which the water rises to the level of the river; *g,* the suction pipe; *h,* the engine house.

A coffer dam must be erected, of a sufficient capacity to enclose the area, estimated as requsite to filter any given quantity of water, and the bed of the river must be dug out, to allow the bed of brick work, set in cement, (or of stone) being laid, and the floor must be constructed as an inverted segment of an arch each way, and the walls

stayed apart in the middle of their height, to prevent their being forced inwards. On the top of this wall are to be laid plates, and in the enclosed area, the granite blocks are to be set; upon these are to be laid the girders, and over these the joists, placed in such a way that they shall support a first layer of large flints, upon which smaller flints are to be laid, so as to be secure from falling through. Upon this second layer, another layer of smaller flints is to be placed, and upon that still smaller flints in succession, decreasing the size in each layer as it approaches the surface of the bed of the river, until the bed is prepared; upon which a stratum of fine clean shingle can be securely deposited. Upon this bed of clean shingle a bed of fine and very clean gravel should be strewed, and on that a bed of filtering sand, until arrived within one foot of the level of the bed of the river, which last space should be then filled up with clean gravel, thereby making a filtering

bed in depth of - - -	8	feet
To which add, for the brick work below	7	do.
For the rise and fall of the tide -	18	do.
And the top of the filtering bed will be below low water mark - -	4	
Total -	37	feet;

thereby requiring piles of about 45 feet in length, to make the coffer dam.

The water will percolate through these different strata, and the sides of the opening being puddled with clay, it will be found that no water can pass (by filtration or otherwise) into the chamber, without passing through the prepared strata, which will thoroughly clear it of all impurities, while the action of the alternate ebb and flood tide upon the surface of gravel, will prevent the possibility

of any deposit or accumulation of filth on the newly made part of the river bed; and as any impurities mechanically suspended, will always be nearest the surface, and being thus suspended, will be continually attracted by the shore (and the difference of gravity, and the strength of current being considered), it is evident that the upper or surface part of the filtering bed will always be clean, and in contact with the cleanest and purest water in the river.

And as a further evidence that the bed of the river, under which the filter is made, must be perfectly cleared from deposit, it is well known, that where the current over a filter is stronger than the progress of the water through the filter, there can be no deposit, which would be the case in this instance; and besides, as a further reason that there can be no deposit, which can remain on the upper bed of the filter, the engine which will draw up the water, will only be required to be worked twelve hours per day, and that only during a part of the tide; and as the water falls in the river, so will the filtered water fall in the reservoir, to find its level, and thereby return upwards through the filter bed; and having been already filtered in its passage down, cannot possibly leave a deposit in the filtering chamber, and must clear away, of necessity, all impurities on the top of the bed, by disturbing the sediment (if any) that might be on the bed of the filter, and which sediment would then be carried away by the current of the river, from over the upper surface of the filtering bed.

It may here be remarked, that the water in the filtering chamber would not be liable to the influence of either the sun or frost, from its being below the action of both, and the water would be constantly fresh and cool from the river, as the filter would be in operation for supply, only while the steam power is at work.

As the water is filtered, and passes into the chamber,

it will be conveyed by the pipe to the well on shore, where it will be completely within reach of pumps worked by steam power, and this communication from the chamber to the well must be made by sinking the well shaft on the shore, while the coffer dam is building, and projecting from the well shaft a horizontal tunnel to the coffer dam, into which an entrance is to be made, at or near the feet of the piles forming that side of the dam next the shore.

An air pipe, not represented in the drawing, may be made to pass through the supply pipe, and up the well, to carry off any air which may get into the upper part of the filter chamber.

When the filter is completed, and in operation, there will not be any obstruction to the Navigation of the river; to all appearance it will be the same as if the filter was not in existence.

II.—On the Employment of Machinery.

To the Editor of the London Journal of Arts.

Sir,—I again obtrude upon your indulgence, hoping that my purpose may plead sufficient excuse, for as the use and progress of machinery is a subject of such vital importance, both as regards individual advantage and national prosperity, I consider it the duty of every one at all related to, or interested in manufacturing concerns, to stand forward in behalf of such measures as are highly conducive to its well being, and to plead in defence of tried and substantial means, unquestionably beneficial to the commercial interests of his country (none more so than the advancement and perfection of productive power); and

it equally behoves those who may be ever so unconnected with business or trade, to refute error—to reconcile prejudice—and to endeavour to allay public excitement, which, even when directed to the acquirement of good and valuable ends, is mostly fraught with a mischievous tendency, but lately raised against the possession and enjoyment of an extraordinary benefit would, if persevered in, have been the effective cause of incalculable and irreparable injury. It is still a very favourite idea with many, that machinery is directly detrimental not only to the poor and labouring classes, but also to the general good of the country. These lovers of opposition base their arguments chiefly upon the prevailing distress, without considering that so far from machinery being the producing cause, it is the only remedy (and that from its partial use but an imperfect one), which prevents our sudden dissolution and commercial death. In taking a disinterested view of the subject, we shall find that through this means principally we have been enabled to defray the annual expenses of our debt—that under its flourishing influence, we have greatly increased our capital—that it has chiefly furnished us power and wealth, adequate to support an unrivalled navy—and from the intercourse with foreign nations, necessary to keep up a commercial correspondence—that it has enlarged our views, promoted speculation, strengthened our resources, and added to our importance both at home and abroad. The more immediate cause of our distress proceeds from a very different source to that which the enemies of all improvement or invention would ascribe it; it is from the existence of laws, enacted (if we may judge from the success of their effect) to impoverish and starve the industrious part of the community; it is from hastily curtailing our currency to a state of total inadequacy, yet continuing those oppressive restrictions which maintain

provisions at a price inaccessible to the labouring poor; it is from closing our markets upon the grain and produce of other countries—naturally causing them to return the compliment upon us—greatly and materially to our loss. It would not be more ungrateful and absurd to deprive the generous horse of its legs, whilst employed in the cultivation of our land, through whose valuable assistance in preparing the soil, we expect to reap an abundant harvest, and then barbarously to turn upon it with the goad and lash for its inactivity and incapability of motion, than it now is, under our existing depression, to raise an unavailing cry against the important benefits derivable from the use of machinery. If I might presume modestly to venture an opinion, so far from machinery producing or increasing our distress, that distress arises from the illiberal restrictions which curb its progress, limit its use, and cramp the whole energies of the nation.

It has been ably proved, that population only increases in equal proportion as the means of subsistence increase; when we consider that the numerical strength of our country is more than doubled within the last twenty years, and that the number of acres within the kingdom cannot possibly have undergone a like increase, this inquiry naturally suggests itself—from whence then have we derived the means to subsist so great an addition of numbers? I will answer by our commerce, by the aid of our machinery, which alone has enabled us to extend our commerce to the necessary degree, by the rapidity and perfection of our inventions, which have given us a triumphant victory over aspiring rivals. The accumulation of capital, the reward of our successful endeavours, serviceably employed in the improvement of our land, has by rendering it doubly productive, furnished occupation for many, food for all. It may be urged if machinery had not existed,

the increase in population would never have taken place; but the productive powers of the soil must also have remained unimproved for want of capital so to be invested, which capital has been accumulated solely by its creative means, with the immense burden of debt and taxes thrown thus wholly upon the shoulders of the land, how could we have stemmed the overwhelming torrent of distress, which must have inevitably ensued. By our manufactures, by our machinery (the nerves, the life, the very vitals of our commerce) we have hitherto in a great measure relieved it from these sinking and oppressive weights. Allowing that the land, unimproved, were capable of producing considerably more than the nation as it before existed required, or could possibly consume, where could a market have been found to give sales and returns with adequate profit, to keep a yearly deteriorating soil in repair, had it not been for our machinery to call forth a consuming population into existence, and continued inventions, and extended improvements to furnish that population with means and wealth to buy? Of what use is it, let me ask, to raise corn, if money or some necessary equivalent cannot be furnished in exchange; to give it away could, in the end enrich neither the donor or receiver, but ruin both, and cause universal stagnation. Is it then fair, is it politic, is it just to turn round upon that source of our prosperity and wealth—our machinery: that very friend which has furnished every necessary equivalent, and to pray for its abolition, denounce its long enjoyed services, and with the savage spirit of oppression, to trample its favours undeservedly and scornfully in the dust?

It is doubted and denied by the gentleman who has styled himself an inquirer into commercial distress, and headed his laboured production by practice opposed to

theory, that we have any certainty, probability or right to expect, even if ever so disposed, to carry on a system of commercial exchange with other countries, that they in return will be so disposed to favour us. In answer I desire to know, what advantage can they derive from a surplus production, of whatsoever nature it may be, more than we can? We feel and labour under the inconveniences of such, so must they; the obligation of a disposition to relieve one another would be mutually acknowledged; they cannot live in a state of nudity more than we can exist in a state of starvation; it is the absence of our fabricated articles in their markets, which compels them to attempt to manufacture for themselves; it is the absence of their corn in our markets which compels us ineffectually to endeavour to raise a sufficient supply for ourselves. By a free access, then, we should very shortly cripple their manufactures, and entirely destroy them; the same effect from their returns, would not be felt by our agriculturists, inasmuch as corn, where there is a deficiency, and at best but a fair supply, always maintains a just and proportionate value in relation to all other kinds of production; the rents and tithes would undoubtedly be lowered, the farmer then could raise his crop at nearly an equal price with foreigners, and Englishmen would encourage, by a preference, the growth of their native soil.

Where can we find a stronger proof of the unexampled and glorious effects resulting from our machinery, than in this simple fact—we can bring the wool from the spot where it is grown, manufacture it into cloth, return it to the same place, under a heavy additional charge for duties (I believe about fourteen or fifteen per cent.), and in fine articles compete with, and in inferior ones undersell those manufactories established in the country for the express purpose of supplying their home markets? I

allude to Russia, where I know such to be the case. Now, if we can perform this at the present enormous price of provisions, and the consequent price of labour, how much more profitably could we continue the same, if the necessaries of life were plentiful and cheap? At least one-third.

Allowing that the receivers of our manufactures are not sufficiently generous to lower their duties correspondingly with the reduction in ours, we should still be able to supply them with this great advantage, namely, our population would be wholly occupied, and food or corn, so absolutely necessary to preserve health, strength and life, would be abundant, and within the reach of all; whereas, taking it at the present time, the quantity we ourselves are capable of growing, if equally distributed to all in the lowest ratio possible to live and work on, leaves a surplus to the number of about five million individuals, who consequently must trust to the inferior crops for their miserable and precarious livelihood.

Throw the whole burden of the country upon the land, as the lovers of restriction and the enemies of machinery appear to wish and labour to effect, could it support it for a moment? No. It is still less possible for our commerce to exist a day without the vital support of the productive powers of machinery. In curtailing our currency, they have amputated the right arm of commerce, and rendered the other inefficient, nay useless, by curbing its force, and cramping its energies with those oppressive chains of illiberality, our corn laws. In curtailing the former, had they equally removed the latter, we still had been as a nation wealthy, prosperous and happy. But now, in the moment of depression, in the hour of our adversity, the favourers of a narrow restrictive system, these upholders of oppression, these advocates of illiberality, these friends of inhumanity, injustice, and starvation, have the daring

effrontery to conjecture and assert, that we who would wish to find employment and food for all, by an extension of our commerce, have caused the present prevailing distress; that machinery, which has been found the efficient means of securing a maintenance to millions, by the perfection and rapidity of its productions, is the whole and sole cause of our present calamitous condition. Sir, such conjectures, such assertions, I take the liberty positively to deny; it is our inability to give full employment to, or sufficiently to extend the limits of this newly awakened power, which inability arises from circumstances previously adduced, namely, the contracted views of our commercial policy; such alone originate and constitute the chief cause of that enervating distress, which all capable of pity must equally lament and deplore. If the enemies of mechanical science wish to repress invention and improvement in toto, which from their tone and manner we must infer, I wonder much that shame alone does not keep them silent; the love of novelty, of which the spirit of invention undoubtedly forms no inconsiderable feature, is universally acknowledged to be one of the most distinguishing characteristics of man above the brute creation, his constant advancement towards perfection, one of the noblest marks of human and intellectual superiority, and so long as one part of the community is elevated above the other, which must ever be the case, so long will an ample stimulant to exertion novelty and invention, be afforded by the wealthy to all who are anxious for distinction, or undebased by apathy and indolent contentment. If they wish to repress such a spirit, I repeat, as well might they oppose, by idle words and ineffectual mandate, the swelling tides, or strive to check the rolling stars, and stop revolving worlds.

The imputation cast upon our commercial interest, in ascribing machinery as the whole cause of our grievous

distress, is evidently the malicious attack of ignorance, well worthy the crafty ingenuity of those illiberal few who daily repeat it; such an opinion is indeed founded in error, hastily formed from examining only one side of the question, and that in a very partial and imperfect manner, and from drawing conclusions contrary to the sober dictates of an unbiassed judgment, whilst the faculties of the mind are enveloped in the dark vapors of prejudice, and the chilling mist of illiberality; nor can we feel surprise, after perusing the injurious, ungrounded sentiments ventured in various publications against scientific improvement and mechanical power, that a misguided and famishing people should take alarm at a friendly shadow, and swell it, under the excitement of momentary fear, into an obnoxious and hurtful monster; let those who seriously urge the abolition of machinery, under our existing circumstances of redundant population, reconsider the subject, and I think that with candour they will retract their opposition, rather than expose themselves to be justly classed with the bigotted, disappointed politicians of the present day, some of whom have been mad enough to declare that they would rather die under the fallacies and errors of the old, corrupt system, than live in peace and plenty under the splendid alterations and invigorating improvements of the new.

I may be induced, under favour of your permission, again to obtrude myself upon your indulgence, feeling confident that no subject can more materially affect our present and future prosperity.

I remain, Sir, yours, &c.,

H. C. Harris.

Recent Patents.

To Thomas Thatcher, *of the parish of Birmingham, in the county of Warwick, saddler, for his invention of an elastic self-adapting saddle.*—[Sealed 7th Sept. 1830.]

SPECIFICATION.

"My invention of an elastic self-adapting saddle, consists in an improved mode of constructing the saddletree with elastic ends or gullets, which enables the saddle to give way by pressure, and adapt itself to the backs of different sized horses, and yet hold with sufficient tightness. The front part of the cushion or pannel is detached from the head of the saddle, and the gullets being inserted into pockets on the sides of the pannel, the saddle and the pannels are held together by straps, which keep them in contact, and prevent the saddle from slipping forward, or the hard firm part of the head of the saddle from galling the neck of the horse, the pannel being in close contact with the skin of the animal, and the friction (if any) operating between the two surfaces of the saddle and the pannel, instead of rubbing the horse's back and neck.

"In the accompanying drawing, Plate II, figure 1, is a front view of the head of the saddletree, detached from the leather covering and padding. Fig. 2, is a top view, and fig. 3, a side view of the same; *a*, is the head of the saddletree, bound with a strap of iron, both on the upper and under sides as usual; *b*, *b*, are the bearings of the saddletree, to which the elastic steel points, or gullet, *c*, *c*, are fastened by rivets, screws, or any other suitable means. The general construction of the saddletree is in no other respect different from those of the ordinary kind, except in the adaptation of the elastic gullets, which I

propose to make of steel, or some other elastic material, instead of the fixed non-elastic wooden points or gullets extending from the saddletree on the old construction. Fig. 4, is a front view of the saddle complete; and fig. 5, is a side view of the same, the flaps of the saddle being in this figure removed, in order to expose the parts that would otherwise be hidden, which shews the mode of inserting the elastic gullets *c*, into the pocket *d*, and also the strap *e*, that holds the pannel and the saddle together. The pannel *g*, *g*, is fixed to the saddletree at the hinder part in the usual way; but at the head it is as before said detached, and only connected to the saddletree by the straps. The pannel is stuffed or padded about the neck part, as at the sides, for the purpose of forming a soft pad between the head of the saddle and the horse's neck, which prevents the saddletree from galling the neck of the horse; and in order that the saddle may lie close to the back of every horse to which it is applied, I insert small pieces of thin cork into pockets in the lining, which are readily placed or displaced when necessary.

"The gullets *c*, being inserted into the pockets *d*, the straps *e*, affixed to the front part of the pannel, are passed through small loops *f*, under the saddletree, and are thence carried to the back part of the pannel, and secured by buckles at *h*, which keeps the saddle and the pannel together.

"The parts claimed by me as new are the elastic ends of the saddletree, called the gullets *c*, and necessarily the separation of the head of the saddle from the pannel with the straps for confining them together, and also the cork padding; all of which I believe to be new and never before applied to the same purpose."—[*Inrolled in the Inrolment Office, March,* 1831.]

Specification drawn by Mr. Newton.

To William Nairn, *of Dane-street, Edinburgh, Mid Lothian, mason, for his improved method or methods of propelling vessels through or on the water by the aid of steam or other mechanical force.*—[Sealed 5th February, 1828.]

This is a new edition of the old *Duck's foot paddle,* which is to be put in operation for the propelling of vessels by means of oscillating pendulums suspended from the sides of the vessels, which are to be actuated by a steam engine, or by any other convenient means.

The pendulous rods are to be made feather-edged, in order to enable them to pass through the water with as little obstruction as possible. At the ends of these rods the paddles are to be attached, each of which consists of pair of parallel flaps, opening and closing upon joints in the middle, like a pair of compasses. When the pendulous rods move towards the stem of the vessel, the flaps of the paddles open upon their hinges, and by presenting a broad resistance to the water as they pass through it, force the vessel forward in an opposite direction. When the rods swing toward the head of the vessel, the flaps collapse and return through the water, with little or no resistance.

There are no drawings annexed to the specification of this Patent exhibiting any particular mode of adapting and working these paddles; but the construction of a flap paddle, upon hinges, being the only thing which appears to be claimed by the Patentee, his intentions will be fully understood by the description given.—[*Inrolled in the Inrolment Office, August,* 1828.]

[We cannot but regret that so many inexperienced persons should be induced to spend large sums of money in obtaining Patents for abortive schemes, which are as old

as the hills. A confidential communication with their patent agent, or any experienced mechanic, would in general prevent this disappointment and serious loss.—EDITOR.]

To JAMES BEAUMONT NEILSON, *of Glasgow, in the county of Lanark, North Britain, engineer, for his having invented and found out an invention for the improved application of air to produce heat in fire forges and furnaces, where bellows or other blowing apparatus are required.*—[Sealed 11th September, 1828.]

THIS invention is the application of heated air, by means of bellows to forges and furnaces for the working of iron and other metals. No particular construction of apparatus is pointed out by which the air is to be heated, and conveyed into the furnace, but it is stated that the air may be heated in a chamber or closed vessel, having a fire under it, or in a vessel connected in any convenient manner with the forge or furnace.

From this vessel the air is to be forced by means of bellows into the furnace, and the quantity which a heating vessel is required to contain for a forge, is about 1,260 square inches; for a cupula furnace, about 10,000 square inches.

The vessel may be enclosed in brickwork, or fixed in any other manner that may be found desirable, the application of heated air to furnaces or forges in whatever way, for the purpose of working iron, being the subject claimed as constituting the invention.—[*Inrolled in the Petty Bag Office, March,* 1829.]

To John Weiss, *of the Strand, in the county of Middlesex, surgical instrument maker, for improvements on instruments for bleeding horses and other animals.*—[Sealed 26th January, 1828.]

The instrument upon which this improvement is founded is called a fleam. A fleam carries a lancet for bleeding horses, which being placed upon the skin of the horse, is usually struck into the vein by the blow of a small hammer. To render the operation more easy, the lancet is in some instruments attached to a spring with a trigger, and the trigger being let off, the force of the spring causes the lancet to penetrate and open the vein.

The present improvement consists in constructing the instrument with a spring hammer, detached from the lancet, which is shewn in Plate II. at fig. 13; *a*, is the lancet; *b*, the hammer, the lower part *c*, of which is a spring; *d*, is a catch, which holds the spring hammer when drawn back in the situation shewn by dots. A trigger on the back of the handle being pressed, causes the catch *d*, to withdraw, when the spring hammer being released, strikes the lancet *a*, forward into the situation represented in the figure, by which its points is made to penetrate the skin and cut the vein of the animal.

A different construction of fleam is shewn at fig. 14, the particular intention of which is, that on the lancet striking into the vein of the horse, it shall immediately withdraw itself from the wound without the instrument being removed. In this figure *a*, is the lancet; *b*, the spring hammer; *c*, the trigger catch; *d*, a small slight spring at the foot of the lancet arm, pressing the lancet back. Supposing the fleam, as in the figure, to be set ready for operation, on withdrawing the trigger catch, the hammer *b*, strikes forward, and in its advance carries the

lancet with it, by bearing against a small projection *e*, on the top of the arm of the lancet. A nick or groove in the back of the hammer now comes opposite to the small projection *e*, and the spring *d*, exerting its force instantly, throws back the lancet from the wound into the position shewn in the figure.

Another construction of fleam is shewn at fig. 15, where the lancet has a circular drawing action; *a*, is the lancet; *b*, its driver; *c*, the impelling spring. The lancet is mounted upon a pivot, and performs a segment of a circle in action, shewn by dots; it has a pinion attached to it, and part of the driver *b*, has a segment of teeth which take into the pinion. The driver is represented in the figure, as drawn back, and held by a trigger catch, ready for action, the impelling spring being compressed into tension. On pressing the trigger the driver is released, and instantly forced round by the spring into the situation shewn by dots, carrying at the same time the lancet through the segment of a circle, so as to produce the drawing stroke required.

Some other variations of construction are contemplated, but embracing the same principles, which are claimed under the several heads of, forming the spring hammer distinct from the lancet—causing the lancet to withdraw itself immediately on giving the wound—and enabling the lancet to produce a long drawing cut by a rotary action. —[*Inrolled in the Inrolment Office, July,* 1828.]

To Samuel Wilkinson, *of Holbeck, in the county of York, mechanic, for his invention of improvements in mangles, which he intends to denominate Bullman's patent cabinet mangle.*—[Sealed 4th December 1827.]

This mangle is constructed with two cylinders, one over the other, the lower one to receive the cloth intended to

be smoothed, which is to be wound round its periphery, the upper one a pressing cylinder, bearing upon the former, and which is held down by weighted levers. The construction is simple and compact, and the Patentee encloses the whole in a neat cabinet with drawers, which forms a handsome piece of furniture, very different in its appearance from all other mangles heretofore made.

Plate II. fig. 6, is a side view of the mangle, mounted upon a frame or standard; *a*, is the cylinder round which the cloth and articles to be mangled are wound. This cylinder is mounted upon an axle, the pivots of which turn in bearings in the standard or framework. The upper or pressing cylinder *b*, which bears upon *a*, is also mounted upon an axle, but the pivots of this turn loosely in long slots or openings in the framework.

There are too pressing levers *c*, one at each end of the cylinder, hanging upon fulcrum pins at *d*, and which, at their reverse ends, are attached by rods *e*, to weighted levers *f*; on these levers the weights are adjustable, in order to give any required force to the pressing levers which bear upon the pivots of the cylinder *b*, and weigh it down to produce the required operation of mangling the cloths as the cylinders turn round.

On the end of the axle of cylinder *a*, a toothed wheel *g*, is affixed, which is driven round by the winch and pinion *h*; and at the reverse end of the axle of *a*, a fly wheel is attached to equalise the motion.

Near the ends of the pressing levers, a transverse bar connects the two together, from the middle of which a chain passes over a pulley *i*, and this pulley *i*, being turned by the lever *k*, raises the weighted leavers off the ends of the pressing cylinder, for the purpose of withdrawing the cloths from the cylinder after they have been mangled.

The Patentee says, that one advantage connected with

this mangle is, that it does not vary its pressure, as those made with springs are subject to do, but when adjusted to the required weight, it remains the same, whether the mangle be full, or empty; and if its pivots wear by use, the pressure can be adjusted, by screwing up the rod *e*.—[*Inrolled in the Inrolment Office, June,* 1828.]

To John Evans, *the younger, of Moreton Mills, near Wallingford, in the county of Berks, paper maker, for his having invented certain improvements on steam engines.*—[Sealed 15th January, 1828.]

This invention applies to a rotatory steam engine, and consists in some slight modifications of the working parts of an engine, in which the rotary power comes immediately from the shaft of the piston.

Plate II. fig. 7, shews a tranverse section of the engine, and of the steam stop, the valves, &c.

A long cylindrical case *a, a, a,* constitutes the fixed part of the engine, which is divided in the middle, into two compartments, by an internal circular flange; within are two cylinders, as *b, b, b,* each half of the length of the outer one fitting at their ends, tightly up to the central flange, and to the caps or end pieces of the larger cylinder, in which they are packed in the usual way, to render the joints steam tight. The two internal cylinders *b,* are not so large in diameter as the outer one *a,* consequently a circular passage is formed, *c, c, c,* which is the steam way. These lesser cylinders *b,* are mounted upon an axle *d,* which extends through the middle of the larger cylinder. One of the smaller cylinders is fixed upon the axle *d,* the other turns loosely upon it, and is only occasionally locked to the axle by a rib or tooth.

A pipe *e*, brings the steam from a boiler, and conducts it into the two steam boxes *f*, on the side of the cylinder, and two slide valves *g*, open and close the steam ways to the respective cylinders.

Upon the central axle at the end of the cylinder, an excentric is placed, which, as it revolves, actuates a lever connected to the rods at the under parts of the two slide valves *g*, which alternately open and shut the steam ways of the two cylinders.

A block or slider *h*, is introduced through the outer cylinder, and forced up against the periphery of the inner cylinder *b*, extending its whole length, which becomes a steam stop, when secured by screws and packing.

The steam being now let on, by opening the cock in the pipe *e*, the steam box *f*, becomes filled, and the slider *g*, being depressed, the induction aperture is opened, and the steam rushes in through the aperture to the circular channel *c*.

The elastic force of the steam now exerting itself against the fixed stop *h*, and against the small flap *i*, which is attached by a hinge joint to the inner cylinder, and acts as a piston, it causes the cylinder to be forced round in the direction of the arrow, and the cylinder being fastened to the axle *d*, the axle necessarily turns round with it.

By the time that the axle and cylinder have made half a revolution, the excentric above-mentioned, upon the end of the axle *d*, causes the lever to raise the slide valve *g*, which now cuts off the supply of steam from the first described cylinder, and by depressing the other slide valve, opens the induction aperture to the other cylinder, which, in its turn, is in like manner driven round by the force of the steam exerted against its flap or piston, and as before said, locking itself to the axle as it advances, drives the axle round through the other half of the revolu-

tion, which carries the first mentioned cylinder with it; and when the flap or piston *i*, of the first mentioned cylinder has passed the aperture *k*, the steam which was contained between the stop *h*, and the flap *i*, escapes or passes off to a condensor.

The flap *i*, in passing the steam stop *h*, falls back upon its hinge joint, but comes into operation again as soon as it clears the steam stop, and receives a new impulse when it reaches the situation shewn in the figure.

In this way the axle is continually carried round, and forms a first mover to drive other machinery.—[*Inrolled in the Inrolment Office, July,* 1828.]

To CHARLES AGUSTUS FERGUSON, *of Mill Wall, in the parish of All Saints, Poplar, in the county of Middlesex, mast maker, and* JAMES FALCONER ATLEE, *of Prospect Place, Deptford, in the county of Kent, Gentlemen, for their invention of certain improvements in the construction of made masts.*—[Sealed 22nd December, 1827.

MADE masts are such masts as are formed by the combination of many pieces, instead of one solid shaft of timber. As the cost of large trees suited to the making of masts is very considerable, combining many pieces together, for the construction of masts for large vessels is now generally resorted to, and these are commonly called made masts.

The present invention purports to be an improved mode of combining pieces of timber for the construction of such masts.

The Patentees propose to employ one long straight shaft as a centre or foundation, and to connect round this

such a number of pieces as shall bring the shaft to the desired thickness. Plate II, fig. 8, may be supposed to represent the horizontal section of one of these made masts. The central part may be square or poligonal, and the surrounding pieces so formed as to fit the angles of the centre part, and correspond exactly to each other when combined.

Fig. 9, is a vertical representation of two pieces of wood connected in the improved way proposed. Two mortice holes *a, a,* are cut in the solid wood, and a perpendicular hole bored from the end of each piece into the mortice, as shewn by dots; an iron pin *b*, is then introduced into these holes, and the ends of the two pieces of wood brought together and made fast, by screwing up the nuts on the ends of the pins in the mortice holes. Similar iron pins and nuts may be introduced on the other sides of the pieces of wood in order to strengthen the joint, in the way shewn at fig. 10.

When the two pieces of wood have been thus united, the mortice holes are to be filled up with small blocks, and resinous cement, in order to prevent the nuts from turning, and the bolts from becoming loose. The several pieces are then brought together round the central shaft, as in fig. 8, with bolts or douls to fix them, and the whole is embraced by rings of iron to keep the pieces secure.

If a central shaft, as a foundation for the made mast cannot be procured of sufficient length, several pieces may be united, end to end, in the way above described, by means of pins and nuts, and then the other pieces are to be placed round it, observing that great care must be taken to block the joints, that is to bring the solid part of one piece of wood over the joint of the adjoining pieces,

and the rings of iron which are to embrace the whole, are recommended to be on the construction described under the following patent.—[*Inrolled in the Inrolment Office, June* 1828.]

To JAMES FALCONER ATLEE, *of Prospect Place, Deptford, in the county of Kent, Gentleman, for his invention of certain improvements on bands or hoops for securing made and other masts, bowsprits and yards, and applicable to other purposes.*—[Sealed 15th January, 1828.]

THE preceding Patent has explained the manner of constructing what are called made masts, and the mode of confining the several pieces of wood together by rings of iron; the present is an improvement in the construction of the rings of iron to be employed for that purpose, and in the mode by which they are drawn tight or fastened round the masts.

Plate II. fig. 11, represents a segment in section of one of these rings at the junction; and fig. 12, one of the rings complete. The ends of the segments have enlargements *a, a,* in which holes are made to receive the double screw *b*. This double screw is made with a right handed thread at one end, and a left handed thread at the reverse end, the female screws in the ends or sockets *a, a,* of the segment corresponding; and in the centre of the screw there is a boss or enlargement with holes to receive the pointed end of a lever, by which it may be turned round for the purpose of screwing up the iron ring tight round the made mast, or any other situation to which it may be applicable.—[*Inrolled in the Inrolment Office, July,* 1828.]

To William Roger, *of Norfolk Street, Strand, in the county of Middlesex, Lieutenant in our Royal Navy, for his invention of certain improvements on anchors.* [Sealed 13th March, 1828.]

The principal feature of improvement proposed, consists in combining wood and iron in the construction of the shank of an anchor. Plate II. fig. 16, shews the anchor so made; *a, a,* are two long plates or flat bars of iron, united at the top of the shank *b*, by welding, and in which the eye is formed for inserting the cable ring. The middle part of the stem of the anchor *c*, is of timber, to which the side plates or bars of iron are secured by bolts and rivets. The flukes *d, d,* of iron, are connected to the side plates by welding, and the central part is made strong by a brace of iron *e*, carried up the sides of the shank.

Fig. 17, exhibits a single fluked anchor. made upon the same principle of timber and iron combined; the two side bars or plates of iron *a, a,* are welded together at the end *b*; and the central part *c*, is of timber with bolts passed through it, riveted on the outside to the iron plates. The fluke *d*, is of wrought iron, and is fastened to the shank by a bolt *e*. One particular feature in this single fluked anchor is that the point of suspension, that is the eye for the cable ring, is not in the centre of the shank, which when the anchor drags, causes the fluke, by its gravity, to keep in contact with the ground; and the end of the shank being elongated at *f*, will enable the anchor to roll over and bring the point of the fluke into a holding position.

The particular points claimed by the Patentee are, 1st, the novel construction of the shank of the anchor, by the combination of wood and iron in the manner described. 2nd. the situation of the point of suspension or eye of the

cable ring in the single fluked anchor; and 3rd, the elongation of the shank for the purpose of turning the fluke over.—[*Inrolled in the Inrolment Office, Sept.* 1828.]

To THOMAS BREIDENBACH, *of Birmingham, in the county of Warwick, merchant, for his invention of a machine or improved mode by the use of machinery of forming or manufacturing tubes or rods, and for other purposes.*—[Sealed 26th April, 1828.]

THE object of this invention, appears to be the manufacture of metal tubes, principally for the posts of bedsteads, which tubes are to be made of thin sheet metal, pressed into the forms of frustrums of cones, by means of the apparatus about to be described.

Plate II. fig. 18, shews the apparatus, consisting of a block *a, a,* which forms the base to be fixed to a bench and a slider *b,* constituting the cover, which is connected to it by dovetailed grooves.

The base part has the half of a conical groove formed in it; the sliding cover the other half of the same conical groove. A mandrel of this figure, that is the frustrum of a cone is provided, and also a piece of plate metal, which is to be cut to such dimensions, as would exactly lap round the mandrel. When this piece of plate metal has been partly bent round the frustrum of the cone, they are laid together in the conical recess or groove of the block *a,* as at *c,* and the cover being then drawn forward over the cone, the plate metal becomes pressed down close upon the mandrel, and assumes the shape required.

When withdrawn from the block, the conical tube thus formed is to be finished in the same way as metal tubes are usually done; that is we suppose brazed at the edges, and afterwards polished and lacquered.—[*Inrolled in the Inrolment Office, August,* 1828.]

To Henry Maxwell, *of Pall Mall, in the county of Middlesex, spur-maker, for an improvement in spring spur sockets.*—[Sealed 13th August, 1828.]

This improvement in spring spur sockets, in order to be clearly understood, requires a previous explanation of the spur socket at present used, which the Patentee says was originally his invention, but for the making of which he did not obtain an exclusive right by patent.

In the back part of the heel of an Hussar boot, a small square hole was made and a small metal box inserted, tightly fitting it, with a spring within; into this socket the stem carrying the rowel of a spur was intended to be introduced, and the spring catching against a notch in the stem of the spur, held the spur fast until drawn out by force. When the stem of the spur was withdrawn, it became necessary to insert a plug into the aperture in the heel of the boot, in order to prevent the socket becoming filled with dirt, when the boot was worn. This detached plug being very subject to be lost or mislaid, was attended with considerable inconvenience, and it is to supersede the necessity of this plug that the present improvement is introduced.

The entrance of the improved spring spur socket has a flap or a door, which when the stem of the spur is withdrawn from the socket, falls down by the force of a spring within the socket, and closes the aperture, completely excluding any dirt from entering; but when the stem of the spur is to be inserted into the socket, a slight pressure from without causes the door or flap to open, and allows the stem to be fixed in the socket, and held fast by a spring, as in the old construction.—[*Inrolled in the Inrolment Office, October,* 1828.]

Novel Inventions.

Improved Rudder.—An improvement in the construction and mode of hanging ships' rudders, has lately been invented by Messrs. Peek and Hammick, of Torquay, Devon, which appears to possess very important advantages over every other construction of rudder that has been heretofore used. There are two objects proposed to be effected by this improvement; the one is to enable the rudder to rise upon its pintals, in the event of the ship taking ground, in order to prevent the injury which rudders generally experience under those circumstances; the other is to prevent the possibility of the rudder being dislodged from its hanging from any accidental external force.

These objects appear to be most satisfactorily accomplished by the invention now introduced; and further that the rudder will be retained at all times in effective operation, even in the event of the ships grounding; and that it is not possible for it to become fixed by a spent shot lodging in its joint, which has frequently been fatal to vessels in action.

The Admiralty appear to have highly approved the plan, and are, we understand, about to fit rudders of this principle to some of the vessels in the Royal Navy immediately. The subject is also about to be taken up by the committee of ship owners at Lloyd's, and by the East India Company.

FROM MR. ROBERTS'S PAPER ON THE LAWS OF PATENTS,

(Continued from page 349, Vol. VI.)

Patents to be held good so far as they are new.

According to the present law of patents, a patent may be set aside if the patentee, in his claim, has included any discovery, invention, or application, ever so trivial, or forming even a very small part of his entire claim, which may have existed at any time prior to his patent, however remote; and whether the same had been successfully used or not.

This appears to be a great hardship, arising from a circumstance which it is quite impossible for a patentee to guard against. Inventions and discoveries are constantly being made in all manufacturing countries, and therefore it is not possible for any person to be acquainted with every latest invention or discovery, whether in his own or any other trade, as the following recent instance will shew:—

A. obtained a patent for improvements in various machines in a certain trade, and, in order to avoid specifying any thing before known to the public, he visited that part of the country where the machines which he had improved were in most general use: he also searched the three enrolment offices, and, after thus satisfying himself that his improvements were new, he lodged his specification. Two months afterwards, to his great surprise, he was written to by an attorney, to state that *B.* a client of his, had obtained a patent, about a week before *A.* for one of *A*'s minor improvements. In both cases the lodging of the specification was deferred until the last day allowed by the patent, and *A.* had searched the offices two days before *B.* had lodged his specification, and consequently he was ignorant of any claim it contained.

Now, although the improvement claimed by *B.* was of a very trivial nature, and there were some important inventions in the patent of *A.* yet it had the effect of rendering the patent liable to be set aside.

As a check upon the two sweeping claims by patentees, the following plan, or something of the kind, has been suggested by one of the gentlemen examined before the

committee of the House of Commons, and may perhaps be as unobjectionable as any, viz.

That, in cases where patentees claim several matters or things as new, they shall, for every matter or thing so claimed which may be proved to have been in use within —years preceding the date of their patent, forfeit one of the fourteen years for which such patent is granted, and that the matter or thing so erroneously claimed shall be the property of the previous patentee, or the public as the case may be.

If every patent containing more than one claim were to be contested,—under the existing law, there is reason to believe that nine out of ten would be set aside on the ground of one of the claims being bad.

Those matters or things should be considered as new, which have not been *publicly* used within a given and moderate number of years; say five, seven or ten years. Men often invent things which, from some cause or other, are suffered to go out of use, and the benefit is therefore lost to the public. Some time afterwards another person may invent the same matter or thing, under more favourable circumstances, and may bring it into very extensive and beneficial use; and he is thereby, if the first inventor omitted to secure his exclusive right, fairly entitled to any compensation which may result from a patent right in it.

Amongst others, the following are inventions which were published more than one hundred years since; but have been brought into benefical use only within a comparatively recent period.

The Hydraulic Press.

The Lever Watch. A gentleman of Manchester is in possession of a lever watch, which has been ascertained to be more than one hundred years old.

The Kaleidoscope.

The Counting Machine, for which the Society of Arts awarded to Mr. Donkin one of their medals.

The Mangle Rack

The title of the patent to set forth the heads of the invention.

If patents were to be granted immediately on application, the title being kept secret until the time allowed for speci-

fying, the person applying for a patent should be required to give to his invention such a descriptive title as will, when inserted in an index to a book, give as clear an idea of its contents as the nature of the subject will admit of.

The following examples are submitted with a view of shewing the kind of information, which the title of a patent ought to contain, as to the nature of the invention: —

For my discovery of the principle, that steam, when generated in a close vessel, possesses great expansive force; which force, I am of opinion, may be rendered useful as a motive power.

For my invention of an apparatus for raising water, by the alternate pressure of the atmosphere and of steam.

For my improvements in the machine for raising water, invented by *A. B.* of *C.*; which improvements consist in an arrangement of mechanism, by which the power of steam is made to give motion to common pumps; and thereby to raise water, without heating the water raised; and thus to effect a great saving of fuel.

For my improvements in the machine for raising water, called a steam engine, which improvements consist in condensing the steam in a vessel placed at a distance from the steam cylinder; and in causing the piston to be forced down by the pressure of steam, instead of that of atmospheric air; and also in the arrangement of the several parts of my improved machine; the object of which several improvements is the saving of fuel.

For my improvements on the steam engine, by which that machine is made self-acting.

For my improvements in the machine for raising water, called a steam engine; which improvements consist in an arrangement of mechanism, by which the steam engine may be made to communicate rotary motion to other machines, without the intervention of a water wheel.

For my improvements in the steam engine; which improvements consist of mechanism for governing or regulating the speed of the engine; and also of mechanism to maintain a correct rectilinear action in the piston rod.

For my discovery of the principle, that threads of cotton, and some other fibrous substances, will be of a much more uniform diameter, if stretched whilst the twist is

being given to them, than such threads will be, if twisted in the ordinary way.

For my invention of a machine for spinning cotton and other fibrous substances, which is capable of giving any stretch or extension to the yarn, whilst the yarn is being twisted. To this machine I have given the name of *Mule.*

For my improvements in the spinning machine called the *Mule,* by which improvements it is made self-acting.

For my improvements in the self-acting *Mule,* which improvements consist principally in the mechanism for performing the process called winding on.

For the application to the purposes of rail-ways, of bars of wrought iron, of certain forms, having great strength.

For improvements in steam boilers; by which boilers are made light, and particularly applicable to locomotive engines—the knowledge of which improvements I have obtained from *A. B.*, of *D.*, for a valuable consideration.

For my invention of a machine for planing metal, marble, and the like substances; by which machine, plain surfaces, such as the beds of billiard tables, may be made with extreme accuracy. It is also adapted to the production of mouldings of any form, in straight, spiral, and a great variety of curved lines.

It will be seen by the foregoing examples, that when the patent is for an improvement, the nature, the object, or the locality of the improvement in the thing improved, is pointed out; and more ought not to be required than the examples set forth, because a more full explanation could but seldom be given before the experiments are comcompleted; to do which in safety is one of the objects in view in recommending that patents should be granted immediately on application being made for them.

Scientific Miscellanies.

On Monday Mr. Britton commenced his course of eight Lectures on Architecture, at the London Institution. The attendance was numerous, and the lecture elicited great approbation.

Scientific Societies.—It is estimated that there are above fifteen hundred learned and scientific societies in the world: above half of which are occupied in the encouragement of agriculture, manufacture and commerce.

Salt Springs.—An investigation has for a long time been carrying on at Lons-le-Saulnier, in France, in order to discover the mine of mineral salt, from which the water proceeds that animates the salt springs. At length the undertaking has proved successful; the sound, after penetrating about three hundred and fifty (French) feet, has touched the salt bank.

Aurora Borealis.—A correspondent of the French Academy writes, that one evening, making some experiments with magnetic needles, he suddenly observed a singular disorder in their action. The next day he heard that the aurora borealis had appeared at that time, and to that phenomenon he attributes the irregularity of the needles.

Botanical Tour in Mexico and Calafornia.—Mr. Drummond, of Belfast, is we learn, about to proceed by New York to New Orleans, and thence to Mexico and Calafornia, on a botanical excursion. The perseverance and activity of this gentleman will ensure useful and important results. He expects to be absent for several years.

Diorama.—The exhibition of a new picture has been opened at the Diorama in Paris. It is painted by M. Daguerre, and represents the Hotel de Ville, on the 28th of July, 1830. The picture of the Deluge is about to be sent to London.

Culture of Silk.—The culture of silk goes on prosperously in the state of New York; Dr. Pascalis writes, that the accounts are flattering from every quarter of the United States. "At the next fair of the Institute" he says, "I shall be able to exhibit a great number of domestic silk productions in the highest perfection." The tree that is planted to feed the silk worms, is the Chinese mulberry.

Morus Multicaulis.—This plant can be propagated with astonishing success. It is even probable that *two* crops of silk may be obtained in one season.

Asbestos.—In a communication recently made to the French Academy by M. Aldini, with reference to his fire-proof dresses, he states, that some experiments which have been made at Milan, seem to shew, that garments composed of asbestos, will supersede the necessity of metallic dresses. A manufactory for asbestos cloth has already been established at Valleline; and a paper maker has it in contemplation to employ it instead of cotton or linen in the fabrication of paper intended for *theatrical* scenery. Asbestos may be easily imported from Corsica, where it is found in great plenty, and of excellent quality. It exists also in several other countries of Europe, in which no use is at present made of it.

Gold Mine.—The Charlestown Gazette announces the discovery of a gold mine in South Carolina, which is so productive that it employs about five hundred workmen. The metal is said to be of singular purity.

New Moving Power.—M. Zgiersky of St. Petersburg, the author of several ingenious inventions and scientific

works, is preparing a publication, which will shortly appear in Latin, in Russ, and in French, and which it is said, will unfold some secrets connected with mechanical science of a nature calculated to be generally useful. This publication will contain a description of a new system for impelling air balloons against the wind; and of the application of the same principle to actuate carriages and agricultural instruments, without the assistance of horses, or other draught animals, and without steam engines.

National Armies.—It has been computed, that in Prussia, there is one soldier in eighty inhabitants; in Austria, one in a hundred and eighteen; in France, one to a hundred and forty-two; in England, one in two hundred and twenty nine; and in Russia, one in fifty-seven.

Unicorns.—An Italian gentleman, named Barthema, said to be entitled to implicit credit, who has just returned from Africa, states, that he saw two unicorns at Mecca, which had been sent as a present from the King of Ethiopia to the Sultan.—*Hobart Town Courier.*

Literary Notices.

Lieutenant Colonel Napier has just published his third volume of the "History of the War in the Peninsula;" and to such as are disposed to think lightly of the military in juxta-position with other professions, we recommend the perusal of this excellent volume in combination with its predecessors, as it will at once satisfy them of the natural endowments, and scientific acquirements absolutely necessary to a formation of the military

character; and to those who are familiar with the science of military tactics, its numerous illustrative passages, and historical details, will at once render it a pleasing and interesting manual, and a valuable history. The gallant author's style is clear, distinct, and elegantly descriptive.

Dr. Lardner in his "Cabinet Cyclopedia has now completed his excellent History of Maritime and Inland Discoveries." The present being the third and concluding volume of the series, is equal to its precursors, both in literary merit and geographical interest. This work contains a narrative of the progress of discovery in the middle ages; and concludes with a sketch of the voyages of Cooke, La Pérouse, King, Ross, Parry, Franklin, Clapperton, and many other celebrated navigators and travellers of latter times. These volumes will be read with great pleasure, and afford considerable information connected with history and geographical science.

"Captain Beechey's narrative of a voyage to the Pacific and Bheering's Straits," has recently appeared; it is really a beautiful volume, there is so much to admire in every page, the story so admirably told, and the information is of so interesting a nature, that it only requires to be once perused, to constitute it a valuable addition to the library of the student, or a pleasing companion to the *boudoir.*

We learn by advertisement that T. Campbell, Esq. author of the Pleasures of Hope, &c. is about to superintend the production of a New Monthly Literary Journal, entitled the "Metropolitan." This Editor, in combination with several leading authors of the day, certainly promises much; we hope to have our anticipations gratified by its appearance; the 2nd of May, is the day appointed for it to meet the public eye.

APPENDIX

To the Report of the Select Committee of the House of Commons, on Patents.

Papers delivered in by John Farey, Esq.

[British Law of Patents for Inventions.]

(continued from p. 299.)

This Act was extended by another in 1777. 17, Geo. III. c. 48. granting another sum not exceeding £.5,000 and regulating the mode of paying lesser rewards for improvements, not worthy of the great rewards. Also in 1780, 20 Geo. III. c. 61. another sum not exceeding £.5,000; and the same again in 1781, 21 Geo. III. c. 52. and by other subsequent Acts.

In 1777 the Commissioners gave Mr. Ramsden £.1,000 for his machines for dividing sextants for observations at sea. Also in 1777 to Mr. Mudge, £.500 to enable him to make his timekeeper.—1774. 14 Geo. III. c. 66.

An Act for enlarging the terms of Letters Patent granted to William Cookworthy, chymist, for the sole use and exercise of a discovery of certain materials for making Porcelain; in order to enable Richard Champion, merchant, to whom the said letters patent have been assigned, to carry the said discovery into effectual execution for the benefit of the public. The patent was only for England, and dated 1768; it was for using Cornish moorstone, and Growan clay, as materials to make porcelain; it was assigned in 1774, to R. Champion, who had incurred great trouble and expense, without bringing it to bear till lately, and could not receive an adequate compensation during the remainder of the term. An additional 14 years was therefore added to the privilege, without altering it in any other respect. A new specification of the mixture and proportion of the materials was to be inrolled. The Act not to hinder the use of the said materials, except in such mixture and proportions, as are so specified. A Public Act.—1775. 15 Geo. III. c. 52.

An Act for vesting in James Watt, engineer, the sole use and property of certain Steam Engines (or Fire Engines,) of his invention, described in the said Act, throughout his Majesty's dominions, for a limited time. This Act recites that a patent

dated 5 Jan. 9th Geo. III. (1769,) granted to James Watt, the sole benefit and advantage of making and vending certain engines by him invented; for lessening the consumption of steam and fuel in fire engines, in England, Wales, Berwick, and the Colonies; and that he inrolled the following description, 29th April, 1769.

My method of lessening the consumption of steam, and consequetly fuel, in fire engines, consists in the following principles; viz. 1. The steam cylinder must be kept as hot as the steam that enters it; either by a case of wood, or by surrounding it with steam, &c. &c.—2. The steam is to be condensed in vessels distinct from the steam cylinder, and which are kept cold by the application of water, &c.—3. Whatever elastic vapour is not condensed by that cold, is to be drawn out of the condenser by pumps, &c.—4. To employ the expansive force of steam, to press on the pistons, and work engines, discharging that steam into the open air after it has done its office, &c.—5. To produce motions round an axis, by applying steam within hollow steam wheels, so as to turn them round, &c.—6. To apply a degree of cold not capable of condensing steam, but only of contracting it, so as to work engines by the alternate expansion and contraction of steam.—7. To use oil, wax, resin, fat or quicksilver, to render the pistons tight.

James Watt has expended great part of his fortune in making experiments to improve steam engines, but on account of the difficulties in execution, could not complete his invention before the end of 1774, when he finished some large engines, which have succeeded. In order to make those engines with accuracy, at moderate prices, a large sum must be previously expended in mills and apparatus; and as several years, and repeated proofs will be required before the public can be fully convinced of their interest to adopt the invention, the term of the patent may elapse before he is recompensed. By furnishing mechanical power at less expense, and in more convenient forms than hitherto, his engines may be of great utility in many great works and manufactures, yet he cannot carry his invention into that complete execution that will render it of the highest utility of which it is capable, unless the term be prolonged, and his property in the invention secured in Scotland, as well as in England and the Colonies.

To enable and encourage him to prosecute and complete his said invention, so that the public may reap all the advantages therefrom in their fullest extent, the Act vests the sole advantage of making and selling the engines therein described (as above,) within Great Britain and the Colonies, in James Watt, his executors, administrators and assigns, during 25 years from

the passing of the Act. The Act not to hinder any persons making any contrivance relating to fire engines, which are not at present of the invention of James Watt, or which are not particularly specified in the Act (as above.) Every objection in law competent against the patent, shall be competent against the Act, except as to the term. The privilege of the sole benefit of the invention not to be assigned or vested in trust to more than five persons, nor divided into more than five shares, or used in any other way contrary to the 6th Geo. I. A Public Act.

Note.—The real title of Mr. Watt's patent was for his method of lessening the consumption of steam and fuel in fire engines. The patent was in force more than 30 years; viz. from the beginning of 1769, to the middle of 1800. Mr. Watt had no patents for Scotland or Ireland, but the Act extends the privilege of the patent for England and the Colonies, to Great Britain and Colonies. There is no clause in the Act to oblige Mr. Watt to describe what he had done since his specification of 1769, although the difficulties which he had overcome between that and 1774, is one of the reasons for the Act; nor to specify what he might do afterwards, although the Act was passed for his encouragement to complete his invention. It would have been a great advantage to the public, if he had been obliged to make a complete specification, to be substituted for the first enumeration of principles; all the litigation in Boulton and Watt against Bull, in 1795, and against Hornblower in 1799, would have been avoided, as all the arguments turned upon the want of a specific description of Mr. Watt's engine. In the Acts for the prolongation of Hartley's and Turner's Patents, the clause relative to the legal objections to the patent, is not general as above, but only mentions objections as to the novelty of the invention; there is no clause for a new specification.

Mr. Watt's invention, and the perfection he gave to it, during the operation of this act, has proved of more value to the nation than can be calculated; probably as much as the inventions of Lord Dudley for smelting iron by pit coal, in 1619, or as those of Hargrave, Arkwright and Crumpton for spinning machinery, about the same date as Mr. Watt. Dudley and Hargrave were not encouraged, but were persecuted, and their works destroyed by mobs; after Dudley's death, his process laid dormant during a century, probably for want of support to him. These great inventions have had a close connection, and each one has promoted the progress of the other very greatly. 1775. 15 Geo. III. c. 61.

An act for vesting in John Liardet, clerk, the sole use and property of a certain composition or cement of his invention, throughout Great Britain and the Colonies, for a limited time.

Liardet's patent was dated 1773, for England and the Colonies. The cement or stocco must be applied to buildings as soon as it is made, and could not be sent to a distance; therefore it could come into use only slowly, so as not to recompence the inventor. The term of the patent was extended eighteen years from the passing of the act, and the patent right extended to Great Britain and the Colonies. The patentee not to be allowed to take more than a specified price for the cement or stucco on buildings. The act not to hinder the use of any other cement or stucco than that at present invented by Liardet, and described in his specification. Every objection to the cement's not being a new invention, sufficient to invalidate the patent, to be a bar to any action brought under this act. The privilege not to be transferred to more than five persons. A new specification of the invention, in its present improved state, to be inrolled. A public act.

This stucco for the walls of buildings, was called Adam's oil cement, because Mr. Adam, the architect, became interested in the patent. In 1778, it was set aside for insufficiency of the specification, on a trial, Liardet *v.* Johnson. 1776, 16 Geo. III. c. 29.

An act for vesting in David Hartley, Esq. the sole use and property of a method by him invented, of securing buildings against the calamities of fire, throughout his majesty's dominions, for a limited time.

Mr. Hartley had a patent for England and the Colonies, in 1773, for his method of applying iron plates to cover the wood work of buildings and ships, so as to prevent the access of fire: and having expended large sums in experiments to perfect the invention, and still more money being requisite, without a prospect of recompence during the term of the patent, the term was prolonged thirty-one years from the passing of the act, and the patent right extended to Great Britain and the Colonies, except as to ships. The invention might be applied in any buildings, used in fitting out or victualling the king's ships of war, without licence from the patentee. The privilege not to be transferred to more than five persons. Any objection to the invention not being new, sufficient to invalidate the patent, to be bar to any action brought under this act. The patentee not to be allowed to take more than a specified price for the iron fire plates. A Public Act.

Note.—Two thousand five hundred pounds was granted by Parliament to Mr. Hartley, to enable him to ascertain the practicability and utility of his method.

This invention was mentioned by Chief Justice Eyre, during the trial Boulton and Watt *v.* Bull, in 1795, as an instance of of a patent for a method; "The invention is no substance or composition of things, it is a mere negative quality, the absence of fire, which effect is produced by a new method of disposing iron plates, in building he did not invent iron plates, but only the method of disposing them to produce the effect. His patent could not be for the effect produced, because that is merely negative, though meritorious.—1777, 17 Geo. III. c. 6.

In an Act for restraining any person concerned in any Contract, Commission, or agreement made for the public service, from being elected, or sitting and voting as a Member of the House of Commons. Section 8. If any person actually possessed of a patent for a new invention, or a prolongation thereof by Act of Parliament, and having contracted with Government concerning the object of the said patent, before the passing of this Act, shall give notice of his intention to dissolve the said contract, the same shall be null and void from the time of giving such notice.—1782. 22 Geo. III. c. 45,

An Act for vesting in Edward Bancroft, Doctor in Physic, the sole property of his invention or discovery of the use and application of certain Vegetables for dyeing, staining, printing and painting certain valuable colours, throughout England, Wales and Berwick, for a limited time. Dr. Bancroft had a patent in 1775, for the use of certain vegetables growing spontaneously in America, for dyeing, &c.; but having been deprived of the benefit thereof, by the American war, the term was extended fourteen years from the passing of the Act; which is not to hinder the use of any invention except that for which the patent was granted; and every objection to the invention not being new, sufficient to invalidate the patent, to be bar to any action brought under this Act. The privilege not to be assigned to more than five persons. A new specification of the invention in its present improved state to be inrolled. A Public Act....1785. 25 Geo. III. c. 38.

An act for vesting in James Turner the sole use and property of a certain yellow colour, of his invention, throughout England, Wales, and Berwick, for a limited time.

Turner had a patent, in 1781, for his yellow colour, which is composed of British materials, and is better and cheaper for painting coaches and other works than that formerly imported, which was poisonous; his colour is now largely exported.

Owing to secret piracies in 1787 to 1789, his sale was almost taken from him; he brought one action to trial, and obtained two verdicts therein (a new trial having been granted), also an injunction, but he only obtained nominal damages, and has not been rewarded for his invention. The act extends the term of the patent, for eleven years, from the 24th June, 1792. Turner not to sell the colour at more than five guineas per hundred weight; the act not to hinder any person from making any yellow colour which was publicly used before the date of the patent, but only such as is of Turner's invention, and as is described in his specification. Every objection which might have been made to the said yellow colour not being a new invention, within the meaning of the act 21 James 1, sufficient to invalidate letters patent, may be bar to any action brought by virtue of this Act. The privilege not to be assigned to more than five persons. A Public Act.

Note.—This Clause (which is in the same words as in other preceding Acts, excepting that of Mr. Watt,) appears not to allow any of the objections which might be made to the form of the specification; which objections were so strong, that a verdict had been given against the patentee, in 1787; Turner *v.* Winter. There is no Clause calling for a new specification.—1792. 32 Geo. III. c. 72.

An Act for more effectually securing to Joseph Booth, and to the public, the benefit of an invention of a machine or apparatus, and certain chemical compositions, for making various kinds of Woollen Cloth; for which he has obtained Patents, (*but has not yet inrolled specifications thereto.*)

A patent for England in 1792, also a patent for Scotland; containing the usual condition of his inrolling a specification within four months after their respective dates. In order to prevent the Invention getting to Foreign countries, this Act allows him (instead of inrolling within four months,) to deliver his specification, within eight months, to the Lord Chancellor, who shall appoint two persons to examine the process therein described; such persons making oath not to divulge the process, to which they shall attend, in order to complete and perfect the said specification; and they shall answer all questions which shall be at any time afterwards demanded of them by the Lord Chancellor respecting the same; and shall return the specification altered and amended, if need be, to the Lord Chancellor, with an affidavit by them, and by Joseph Booth, that the specification fully and accurately defines and describes the whole invention and discovery, and the method of using the same. The specification and affidavits shall be enclosed in a cover,

under seal of the Lord Chancellor, and shall be lodged in the office of one of the Masters, to be by him appointed. § 2. The packet shall not be removed from the custody of the Master, on any pretence, except by order of the Lord Chancellor, who may open the same, if required, on account of application being made for patents for inventions of a similar nature, or on account of any trial at law; and after such use the packet shall be sealed again, and deposited with the Master, to remain there, until the end of the fourteen years term of the patent, and then the specification shall be inrolled, as directed by the patent. § 3. The above shall be held as a performance of the provisoes of the patents for England and for Scotland. And also (§ 4.) of the proviso of a further patent intended to be granted for the colonies, and for which His Majesty has signed a warrant.

Mr. Booth intended to operate by machinery upon a tissue or web of carded wool, so as to interlace or entangle, and felt the fibres together, and thus form cloth, or rather felt, without the previous operations of spinning and weaving. Mr. Booth's invention was tried on a large scale at Taunton, also near Salisbury, and again at Merton, near London, but without any success; the felt not having any of the strength and durability of woollen cloth.—1792. 32 Geo. III. c. 73.

Mr. Jonathan Hornblower made application to Parliament for an Act to prolong the term of his patent of 1781, for a Fire or Steam Engine for raising water.

The bill was withdrawn in consequence of the opposition made by Messrs. Boulton and Watt, on the ground that Mr. Hornblower's engine was a plagiarism of Mr. Watt's invention, for which he had a patent in 1769, and an Act for extension in 1775. In 1792.

A Committee of the House of Commons was appointed to enquire into, and ascertain the merits of certain Marine Time-Keepers, invented and made by Mr. Thomas Mudge, in 1774 and 1777.

In consequence of the recommendation of the Committee, a reward of £. 2,500 was given to Mr. Mudge, in addition to the £.500 which had been paid to him, in 1777, by the Board of Longitude. During this enquiry, the Committee found that two chronometers made by Mr. Arnold had performed better than those of Mr. Mudge. A description of Mr. Mudge's time-keeper was published in 1792.

Note.—In 1794, Mr. Arnold had a reward of £. 1,322 for those chronometers, and in 1805, his son received a further reward of £.1,678 for them, making in all £.3,000 to Mr. Arnold. Mr Earnshaw, another successful maker of chronometers, re-

ceived £.500 in 1799, and £.2,500 more in 1805, making £.3000. In 1793.

An Act, allowing the exercise of an invention of a new method of tanning Hides and Skins. Confirmed and extended by another Act, 35 Geo. III. c. 97.

Samuel Ashton had a patent in 1794, and duly enrolled, a specification of the method, and of the ingredients to be used in the tan-liquor; but doubts having arisen, whether such method be within the provisions or restriction of certain Acts of Parliament, and consequently, whether the patent be valid. This Act declares, that nothing in any previous Act shall be construed to prevent S. Ashton, or others, by his licence, during the term of his patent, or any persons whatsoever, after the expiration of that term, from tanning hides and skins in the manner, and with the materials described in his specification, nor from selling hides and skins so tanned. The Act not to be construed to give any greater validity to the patent, than it would have had if no such Act had been in force at the date of the patent. A Public Act.

An Act for vesting in the Right honourable Henry Seymour Conway, the sole property of a kiln or oven, by him invented, for burning Lime, and for the use of distillers and brewers.

He had a patent for England in 1782, and also a patent for Scotland in 1786. His plan was to make a kiln for burning lime, and with the same fire to serve at the same time for giving heat to a still or boiler placed over it, and in such manner, that the coles used would be converted into coke. In consideration of the great expence the patentee had incurred, without getting the plan into use; § 1. The term of the privilege is prolonged, during 20 years, from the 1st January 1796, within Great Britain. § 2. The Act not to hinder the making of any kiln by any method not then invented by him, and as specified in the Act; and every objection in law competent against the patents, to be competent against the Act, except as to the term. § 3. The privilege not to be transferred to more than five persons.—1795. 35 Geo. III. v 68.

(*To be continued.*)

List of Patents,

Granted by the French Government from the 1st October to the 31st December, 1830.

To Mr. Jacques Wall, tinman and lamp-manufacturer, Paris, for a smoke consuming apparatus, applicable to lighting of all descriptions. 5 years.

— Mr. Jacques Wall and M. de Laveleye, Paris, for a new invented self supplying-lamp, called "lampe Chemique." 10 years.

— Félix Laubereau, Paris, for a self-supplying manoscope lamp, having a double current of air. 15 years.

— Charles Pitiot and Charles Gariot, silk manufacturers, Lyons, for a batten, styled "à étages," used in manufacturing ribbons. 5 years.

— François Meugnot, of Nan-sous Thil, Dijon, for a machine for making nails for wheels and the use of ship builders. 5 years.

— Joseph Maximilien Vayson, carpet manufacturer, Abbeville, for improvements in making mocatta carpets. 10 years.

— Philibert Roussy, silk manufacturer, Lyons, for a new invented regulator, called "comptometre de Roussy," used in weaving all kinds of figured stuffs. 5 years.

— Alphonse, Ernest, Bernard, Maximilien Renaud de Vilbach, of Montpelier, for an iron rail road. 15 years.

— Louis Roth, Paris, for an apparatus for boiling syrups without lessening their quality. 15 years.

— Michel Laurent Huet, Paris, for a portable vapour bath. 10 years.

— Louis Ranglet, paper manufacturer, of Montivilliers, for a new method of bleaching paper. 10 years.

— Pierre Ferrand, Paris, for an improved mechanical kneading machine. 5 years.

— Gavard, Lieutenant, engineer and map designer, Paris, for an apparatus for drawing and engraving, without any knowledge of the art. 10 years.

— Jean Gustave Deleuze, jeweller, Paris, for an improved shirt button, adapted to other uses. 5 years.

— François Toussaint Laroche, chemist and druggist, of Bergerac, for an unction for curing corns. 5 years.

— Messrs. Urau, Houdry and Leuty, Lille, for a machine for spinning flax. 5 years.

— François Schmitz, tinman and ironmonger, Nancy, for an improved cooking apparatus, called "cuisine economique." 5 years.

— Messrs. Daudé and Bérand, Paris, for an improved method of stay making, by means of which they can be laced or unlaced without assistance. 5 years.

— Jean Harper Hook, engineer, Paris, for a mill for bruising bark for tanning, and other animal, vegetable or mineral substances. 5 years.

— Messrs. Delleaume, Vincent and Deniau, Paris, for a preparation of earth, called "hydroferè," applicable to the fine arts and to commerce. 10 years.

— Claude Fénéon, architect, of Vandenesse les Charolles, for an improved steam engine, called "machine à recul." 15 years.

— Camille Pleyel, & Co. Paris, for a process to prevent flaws or cracks, &c. in the sounding boards of harps and pianos. 5 years.

— Barthélemi Lalègue, Vaugirard, near Paris, for an apparatus, called "multiplicateur mécanique. 15 years.

— Antoine Chalet, lamp-manufacturer, Paris, for a new invented castor for furniture, &c. called "roulette coule." 10 years.

— Nicolas Guillaume Cartier, mechanic, Paris, for a machine for bolting and sifting flour and other farinacious substances, called "tamis cluteau." 15 years.

— Domeny, harp maker, Paris, for an improved mechanism with double movement. 10 years.

— Claude Jaillet, junior, pattern drawer, Lyons, for a machine for making all sorts of figured stuffs. 15 years.

— Thomas Bulkeley, London, for a new process of making wax and tallow candles, and other compositions run in moulds or shapes. 15 years.

— Charles Frédéric Johnson, of New York, for an improved machine for spinning wool, and other substances, by a continued circular movement. 15 years.

— François Félix Leulliers, Paris, for a small apparatus in the form of a music desk, called a "transpositeur musical." 5 years.

— Jules Napoléon Simyan, Paris, for certain improvements in the construction of steam engines. 5 years.

— Pierre François Herbin, jeweller, Paris, for an improved clasp for ear-rings. 5 years.

— Antoine Fayard, chemist and druggist, Paris, for an improved warming pan, called the "cassinoire chaufferette de sureté à l'eau bouillante. 5 years.

— Louis Serbat, chemist, for a prepared charcoal, for refining sugars. 5 years.

— Joseph Montégut, locksmith, of Rochefort, for improvements in propelling machinery, particularly applicable to vessels. 10 years.

— Third patent to M. Louis Serbat. 15 years.

— Jean Antoine Raymond, dealer in foreign timber, Paris, for a metallic tongue, with or without mastic, adapted to unite different bodies, and damp-proof. 15 years.

— Pièrre Marié Bernard Robin, Rochefort, for an improved safety lock, with concentric cylinders. 15 years.

— Jean Alexis Verguet, brewer, of Carcassonne, for an improved mill, with cylindrical top, adapted to the use of brewers. 10 years.

— Antoine Perpigné, Paris, for an improved filtering machine. 10 years.

— Louis Nicolas de Bergue, Paris, for an improved loom for weaving flax, cotton, silk or wool. 15 years.

— Messrs. Ravigneaux and Taviôt, of Troyes, for an improved loom for weaving in the English style. 10 years.

— Jean Joseph Fayard, wood-merchant, Paris, for an improved measure, called "peso-stére," for measuring fire wood. 10 years.

— Louis Serbat, chemist, Paris, for an improved liquid blue for dying linen. 5 years.

— Messrs. Hebert and Lussiez, Paris, for new invented paintings, called "caupalicks." 10 years.

— Jean Baptiste Crepet, junior, locksmith, of Chalons-sur Saône, for a fly-press for making bricks, tiles, &c. called the "presse excentrique." 5 years.

— Antoine Dominique Sisco, Paris, for an apparatus, called "monte-ressort boite," containing every utensil for taking fire arms to pieces, cleaning, &c. 5 years.

— Jean Julien Josselin, laceman, for an improvement in the manner of lacing stays, by which they may be laced or unlaced at once. 5 years.

— Pape, pianoforte maker, Paris, for an improved piano, and a new arrangement of the hammers. 10 years.

— Victor, Javal and Co. of Issy-les-Sables, for the application of the hydraulic press in making imitation stone. 10 years.

— Joseph Chesborough, dyer, of Manchester, for certain improvements in the direction of the cotton or threads in spinning. 15 years.

— François Auteroche, Paris, for an improved night lamp, called "veilleuse aspirante." 5 years.

— François Berjou, Paris, for a new invented carriage, called a "ménagère." 5 years.

— Jean Baptiste Edward Delarue, Caen, for an improved hydraulic close stool, with springs. 5 years.

— Jean Baptiste Edward Delarue, Caen, for an improved syringe, with springs. 5 years.

— Gazy Cazalet, Versailles, professor of natural philosophy, for a new invented lamp and aerostatic candlesticks, and other improvements. 10 years.

— Antoine Marie Preynat, macanician, of St. Etienne, for a new invented batten for making figured ribbons and other improvements. 5 years.

— Robert Hicks, surgeon, London, for certain improvements in baking bread. 15 years.

— Ramachard and Co. Paris, for an improved arm chair and hydraulic close stool combined, free from any odour. 5 years.

— Messrs. Schmidt and Loyau, engineer, Paris, for an improved log book. 5 years.

— Messrs. Schmidt and Loyau, engineers, Paris, for an improved mariner's compass, "á rosette morte." 5 years.

New Patents Sealed, 1831.

To Jeremiah Grime, the younger, of Bury, in the county of Lancaster, copperplate engraver, for his having invented a certain method of dissolving snow and ice on the trams or railways, in order that locomotive steam engines and carriages, and other carriages, may pass over rail roads

without any obstruction or impediment from such snow or ice.—Sealed 21st February, 6 months.

To Richard Burgess, of Northwich, in the county of Chester, M.D. for his having invented a drink for the cure, prevention, or relief of gout, gravel, and other diseases, which may be also applied to other purposes.—21st February, 2 months.

To Samuel Dunn, of Southampton, engineer, for his having invented certain improvements in or method of generating steam.—21st February, 6 months.

To Richard Trevithick, of Saint Aith, in the county of Cornwall, for his invention of an improved steam engine.—21st February, 6 months.

To Richard Trevithick, of Saint Aith, in the county of Cornwall, engineer, for his having invented a method or apparatus for heating apartments.—21st February, 6 months.

To William Sneath, of Ison Green, in the county of Nottingham, lace maker, for his having invented or found out certain improvements in or additions to machinery for making, figuring or ornamenting lace or net, and such other articles, to which the said machinery may be applicable.—21st February, 6 months.

To Richard Abbey, of Walthamstow, in the county of Essex, Gentleman, for his invention of a new mode of preparing the leaf of a British plant for producing a healthy beverage by infusion.—21st February, 6 months.

To William Furnival, of Wharton, in the county of Chester, Esq. for his invention of certain improvements in evaporating brine.—21st February, 6 months.

To John Phillips, of Arnold, in the county of Nottingham, servant-man, for his having invented or found out certain improvements on bridles.—21st Feb. 6 months.

To Richard Williams, of College Wharf, Belvidere Road, Lambeth, Surrey, engineer, for his invention of certain improvements in steam engines.—28th February, 6 months.

To David Seldon, of the borough of Liverpool, in the county palatine of Lancaster, merchant, in consequence of a communication made to him by a foreigner residing abroad, for an invention of a certain improvement or certain improvements in machinery used to give a degree of consistency to, and to wind on to bobbins, barrels or spools, rovings of cottons and the like fibrous substances.—26th February, 6 months.

To David Napier, of Warren Street, Fitzroy Square, engineer, and James Napier and William Napier, of Glasgow, engineers, for their invention of certain improvements in machinery for propelling locomotive carriages.—4th March, 6 months.

To Apsley Pellatt, of Falcon Glass Works, Holland Street, Blackfriars Bridge, in the county of Surrey, glass manufacturer, in consequence of a communication made to him by a person residing abroad, and partly discoveries by himself, for an invention of an improved mode of forming glass vessels and utensils, with ornamental figured patterns impressed thereon.—9th March, 6 months.

To Robert Stephenson, of Newcastle-upon-Tyne, Northumberland, engineer, for his having invented an improvement in the axles and parts which form the bearings at the centre of wheels for carriages, which are to travel upon edge railways.—11th March, 4 months.

To Charles Wood, of Macclesfield, Chester, manufacturer, for his invention of certain improvements in machinery for the spinning of cotton, silk, flax, wool, and other

fibrous substances of the like nature, as well as for throwing, doubling and twisting threads and yarns made of the same materials.—11th March, 6 months

To William Peeke, of Torquay, in the parish of Tormsham, in the county of Devon, shipwright, and Thomas Hammick, of the same place, shipsmith, for their having invented or found out certain improvements in rudder hangings and rudders for ships or vessels.—21st March, 6 months.

To George William Turner, of the parish of Saint Mary Magdalen, Bermondsey, in the county of Surrey, paper maker, for his having invented or found out certain improvements in machinery, or apparatus for making paper.—21st March, 6 months.

To Peregrine Phillips, jun. of Bristol, vinegar maker, for his invention of certain improvements in manufacturing sulphuric acid, commonly called oil of vitriol.—21st March, 6 months.

To John Potter and James Potter, of Spiedly, near Manchester, spinners and manufacturers, for their having invented certain improvements in machinery or apparatus applicable to the spinning or twisting of cotton, flax, silk, wool and other fibrous materials.—21st March, 6 months.

To George Royl, of Walsall, in the county of Stafford, whitesmith, for his having discovered an improved method of making iron pipes, tubes or cylinders.—21st March, 6 months.

CELESTIAL PHENOMENA, for April, 1831.

D.	H.	M.	S.	
1	0	0	0	Clock before the ☉ 4 *m.* 7 Sec.
1	2	0	0	☾ in conj. with ψ in Libra
1	19	0	0	☾ in conj. with φ in Oph
5	0	0	0	Clock before the ☉ 2 *m.* 55 Sec.
5	0	3	0	☾ in □ last quarter
5	0	2	0	☾ in conj. with *d* in Sagitt
9	5	0	0	☾ in conj. with λ in Aquarius
9	14	0	0	☾ in conj. with φ in Aquarius
10	0	0	0	Clock before the ☉ 1 *m.* 29 Sec.
11	12	0	0	♀ in conj. with δ in Aries
12	4	0	0	Eclip. conj. or ● new moon
13	2	0	0	☽ in conj. with 2 ξ in Ceti
13	8	0	0	☽ in conj. with μ in Ceti
14	3	0	0	☽ in conj. with f in Taurus
14	22	0	0	☽ in conj. with γ in Taurus
15	0	0	0	Clock before the ☉ 10 sec.
15	0	0	0	☽ in conj. with 1 δ in Taurus
15	0	0	0	☽ in conj. with 2 δ in Taurus
15	5	0	0	☽ in conj. with α in Taurus
17	1	0	0	☽ in conj. with ν in Gemini
18	18	27	0	in □ first quarter
20	0	0	0	☉ before the clock 1 *m.* 1 *s.*
20	8	47	0	☉ enters Taurus
21	0	0	0	in conj. with α in Leo
21	11	0	0	☽ in conj. with ρ in Leo
22	4	0	0	♀ in conj. with 1 A in Taurus
22	4	0	0	☿ in conj. with δ in Aries
22	11	0	0	☽ in conj. with σ in Leo
24	4	0	0	☽ in conj. with 1 γ in Virgo
25	0	0	0	☉ before the Clock 2 *m.* 2 Sec.
25	6	0	0	♂ 132 in Taurus
26	6	0	0	♀ in conj. with 2 κ in Taurus
26	12	19	0	Ecliptic oppositiou or ◯ full moon
27	22	0	0	☿ in conj. with κ in Taurus
27	22	0	0	☾ in conj. with γ in Libra
28	0	0	0	♄ Stationary
28	9	0	0	☾ in conj. with ψ in Libra
29	1	0	0	☾ in conj. with φ in Oph
30	0	0	0	☉ before the clock 2 *m.* 52 sec.

The waxing moon ☽.—the waning moon ☾

METEOROLOGICAL JOURNAL, for Feb. and March, 1831.

1831.	Thermo.		Barometer.		Rain in inches.	1831.	Thermo.		Barometer.		Rain in inches.
	Hig.	Low	High.	Low.			Hig.	Low	Hig.	Low.	
Feb.						Mar.					
26	50	35	29,39	29,12	,05	12	50	30	29,86	29,43	,075
27	49	31	29,34	29,13	,175	13	47	36	29,56	29,41	,1
28	46	31	29,62	29,46	,25	14	48	34	29,66	29,56	,325
Mar.											
1	45	29	29,86	29,74		15	50	35	29,71	29,46	,125
2	55	31	29,72	29,62	,05	16	57	40	29,73	29,55	,15
3	57	43	29,62	29,52	,15	17	59	49	29,89	29,76	
4	56	40	29,86	29,66	,175	18	52	33	30,13	30,06	
5	50	43	29,78	29,53		19	49	31	30,13	30,06	
6	52	45	29,36	29,12	,075	20	55	32	30,04	30,00	
7	51	38	29,75	29,58	,05	21	56	42	30,03	30,00	
8	51	26	29,70	29,46		22	49	39	30,26	30,16	
9	56	34	29,63	29,46	,05	23	45	33	30,28	30,12	
10	47	25	29,90	29,83	,075	24	39	27	*29,94	29,70	
11	51	29	29,70	29,60	,075	25	45	30	29,68	29,46	,025

Edmonton. *Charles Henry Adams.*

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XXXVIII.

[SECOND SERIES.]

Original Communications.

III.—On W. Dettmer's Patent Piano Forte and Harmonic Temperament.

To the Editor of the London Journal of Arts.

Sir,—As a lover of music, I am induced to request the favour of your inserting a few observations upon the above subjects in your valuable publication. The deficiency of all musical instruments, with fixed notes, to express the true sounds of the diatonic scale, especially in modulating from one key to another, has been universally observed, and generally complained of by practical musicians. In respect of wind instruments, such as trumpets, clarionets, flutes, &c. the uneven intonation produced by the almost unmanageable variation of the impetus and weight of

wind given by the performer, adds greatly to the obvious inherent defect of these instruments ; but in keyed manual instruments having a regular blast of wind, such as the organ, the separate notes of which can be tuned through its octaves upon a system of harmonic temperament according to the skill and inclination of a practised operator, the defects of fixed notes may be nearly obviated.

The piano forte and similar keyed instruments having fixed sounds, capable of being *separately* tuned, so as to exhibit an *equal* temperament throughout all its octaves, may (as well as the organ with twelve semi-tones or keys in each octave) be sufficiently well tuned for the practical purposes of the most delicate ear.

I have carefully attended to the effects of Mr. Lœschman's, and of other attempts to remedy the supposed defects of the scale of twelve semi-tones, without the least reference to the difficulty of execution, or the great cost of introducing additional tones, and am satisfied that upon a good system of tuning, there is produced a more agreeable sensation to the mind by the admixture of the major and minor concords upon a twelve-keyed instrument, than can be effected by increasing the number of the tones or keys, so as to represent all the actual sharps and flats of the scale.

All the instruments I have heard, with a large additional number of tones in the octave, are monotonous; the several keys and all the chords minor as well as major being equally harmonious, there is produced a fatiguing dullness of expression; the modulation from one key to another is perfectly insipid. However good the supposed improvements may be in theory, practical musicians have not supported them, and after years of trial from Lord Stanhope's time, they have only served to elucidate the theorems of the philosopher.

It will be obvious from the foregoing observations, that the great advantage of the organ and piano forte over other instruments, having twelve fixed sounds to express all the note, that is rather all the natural flats and sharps that occur in the octave is, that the several sounds (viz. the pipes and strings giving the twelve semi-tones) can be separately and individually tuned, so as to form a combined system of temperament, producing the most pleasing effect to the ear. If that adjustment or temperament is altered so as to become unequal through the several octaves, the instrument ceases to be in good tune, although many of the chords taken may not be harsh to the ear, many others will become insufferable. Now the supposed improvement in Mr. Dettmer's patent,* which is described as enabling the piano forte, "after having been properly tuned to be brought into unison with other instruments of a different pitch, *by raising or lowering the tone of all its strings by a simple operation, instead of the trouble of tuning each string separately*," is, in my humble judgment, any thing but an advantage, so far as the evenness of the adjustment or temperament throughout the instrument is concerned. The patent is I believe worked by Mr. Tomkisson, the piano forte maker, of Dean-street; at least I have there seen several instruments precisely answering the description of Mr. Dettmer's improvement. I have examined the effect of altering the tension of the wires "by simply moving the adjusting screws of the tension bars," by which means the blocks carrying the pegs are brought into a new position. The whole body of the strings is thus made sharper or flatter as may be required; and I candidly acknowledge, that this alteration of the general *pitch* of the instrument

* See Vol. VI, page 329, Second Series of this Journal.

is a great accommodation to singers who understand little of music, and cannot alter *their pitch* so as to sing a piece in a different key to that written, or to others who are so highly finished in the art, and well gifted with accompanying hauteur, that they *will* not alter their pitch to the instrument, and expect (as Madame Catalani did) that an entire band should rather accompany their sweet voices in a different key to that in which the music is written, than accommodate their "song divine" to the pitch of the band.

Mr. Dettmer's improvement is also an accommodation to accompanying instruments, with fixed tones, which are themselves worse tuned than the piano after its new patent adjustment; and I will acknowledge that the instrument after such adjustment, is not altogether out of tune, when any note is merely sounded with its octave. But the *temperament* of the instrument is altered in its several distinct octaves, and the adjustment of such equal temperament no longer continues the same throughout the entire scale of the instrument. This is a defect which may be remedied by the making of separate moving blocks to the several octaves.

It is therefore evident, that the defect of unequal temperament is inherent in Mr. Dettmer's moveable block, for it gives an equal or nearly an equal tension or relaxation of the strings throughout the instrument, although the bass strings are three to six times longer than a treble octave. By this operation, not only is the *tension* of strings altered *unequally* throughout the several octaves, but the same length is added or substracted to or from the longest and the shortest strings, to the evident disarrangement of the previous adjustment of the temperament in tuning.

I trust these few observations may prove conducive to

the amelioration of Mr. Dettmer's ingenious invention, and not be unacceptable to such readers of your Journal as may feel interested in improvements connected with the delightful science of music.

I am, Gentlemen,

Yours, &c.

F. L. S.

Isleworth, April, 1831.

Recent Patents.

To DANIEL TOWERS SHEARS, *of Bankside, in the borough of Southwark, in the county of Surrey, coppersmith, for his having invented certain additions to and improvements in the apparatus used in distilling, and also in the process of distilling and rectifying.*— [Sealed 31st March, 1830.]

THESE improvements are stated to be founded upon a patent granted to Joseph Corty, dated 20th January, 1818, for "certain improvements on and additions to stills, or the apparatus used for distilling, and also in the process of distilling and rectifying," which invention consisted in connecting two stills together, and causing the vapour and spirit which rose in the first still head to pass through the connecting passage into the second still, and there to mingle with the wash or liquor contained in the second still, in order that it might undergo evaporation a second

time; and also in causing the vapours which rise in the head of the second still to be carried to the lower part of the condensing apparatus, instead of the top, or the side, as in the usual construction of worms for refrigerating; by means of which contrivance the vapour rises through the condensing apparatus instead of descending in it.

A section of the apparatus, which formed the subject of Corty's patent is shewn in Plate III, at fig. 1, consisting of the first still *a,* the second still *b,* the connecting tube *c,* which leads from one to the other, and the tube *d,* leading from the second still head down through the bent tube *e, e,* to the lower part of the condensing apparatus.

The original improvements described under Corty's patent, consisted further in placing boxes *f,f,f,* of the condensing apparatus in horizontal positions, and at a distance from each other, in order that the vapour might ascend through them, for the purpose of discharging the spirit by the top tube *g,* and pipe *h,* into the worm, in a highly rectified or concentrated state. In each of the boxes *f,* there is a convex plate or inverted dish *i, i, i,* and the vapour in rising from the tube *e,* strikes against the concave or under part of the first dish, and then escapes round its edges and over its convex surface to the under part of the second dish, and so on to the top, the condensed part of the vapour flowing down again into the still, and the spirit passing off by the pipe *h,* at top; and as the process of condensation will be assisted by cooling the vapour as it rises, cold water is made to flow over the tops of the boxes *f,* from a cock *k,* and through small channels or tubes on the sides of the boxes, and is ultimately discharged by the pipe *l,* at bottom.

Fig. 2, represents a peculiarly shaped tube *a,* through which the spirit is described as passing after leaving the

end of the worm at *b*, which tube is open to the atmospheric air at *z*; *c*, is the passage through which the carbonic acid gas is described as escaping into the vessel of water *d*.

Now the improvements claimed under the present Patent are exhibited in the said Plate III, at figs. 3, 4 and 5. Fig. 3, represents the external appearance of a still, the head of which is made very capacious, to guard against over boiling by any mismanagement of the fire; fig. 4, is the same partly in section. On the top of the still head is formed the first described rectifying apparatus, or series of condensing boxes. The vapour from the body of the still filling the head, meets with the first check from the dish or lower vessel *i*, and after passing under its edges, ascends and strikes against the lower part of the second dish or vessel *i*, and so on, and ultimately leaves the still head by the pipe at top.

This part of the apparatus is slightly altered from the former by the substitution of hollow convex vessels, instead of the inverted dishes before described, which vessels have rims descending from their under surfaces for the purpose of retaining the vapour. The cold water, which as above described, flowed over the tops of the boxes *f*, for the purpose of cooling them, now flows also through the hollow convex vessels *i*, within the boxes, and by that means greatly assists the refrigerating process, and by which the aqueous parts of the vapour are more readily condensed, and made to fall down and flow back again into the body of the still, while the spirituous parts pass off at top to the worm, in a very high state of rectification.

After the water employed for the refrigeration has passed over all the boxes and through all the vessels, it is carried off by the pipe *m*, through the vessel *n*, called

the wash heater, that is the vessel in which the wash is placed previous to introducing it into the still. The pipe *m*, is coiled round in the lower part of the vessel *n*, in order that the heated water may communicate its caloric to the wash, instead of loosing the heat by allowing the water to flow away. After the heated water has made several turns round the wash heater, it passes out at the curved pipe *o*, which is bent up, in order to keep the coils of the pipe within always full of water.

Instead of the coiled pipe *n*, last described, the Patentee proposes sometimes to pass the hot water into a chamber in a tub or wooden vessel as at *n*, in fig. 5, in which the wash to be heated occupies the upper part of the vessel, and is separated from the lower part by a thin metallic partition.

The swan neck *h*, figs. 3 and 4, which leads from the head of the still, conducts the spirit from the still through the wash heater, where it becomes partially cooled, and gives out its heat to the wash, and from thence the spirit passes to the worm tub, and being finally condensed, is passed through a safety tube, as fig. 2, before described, and by the funnel is conducted into the cask below.

Should any spirit rise in the wash heater during the above operation, it will be carried down to the worm by the neck *p*, and coiled pipe, and discharged at its lower end, or it may be passed into the still head, as shewn in fig. 1.

The Patentee, in conclusion says, I do not mean or intend hereby to claim, as my invention, any of the various parts herein shewn or described which may be already known or in use; I do hereby claim the converting of the convex metal plates into vessels, furnished with hoods, by affixing metal bottoms and rims thereto; and the mode of causing the water to circulate in the manner above

described, and also the mode of supplying the said water, so as to cause it to give out the heat it has thereby acquired in raising the temperature of the wash contained in the wash heater; and although I have shewn three boxes as constituting my said improved condensing and rectifying apparatus, yet I do not mean or intend hereby to limit myself to the employment of that number only, but to use more or fewer thereof as circumstances of the size of the utensils may require. I can likewise either cause the water to circulate through the whole condensing and rectifying apparatus in the manner herein shewn and described, or make a partial supply thereof to each box, if circumstances should demand it. I likewise hereby claim the employment of any fit and proper material or materials in the construction of my said distilling, or distilling and rectifying apparatus.—[*Inrolled in the Inrolment Office, September,* 1830.]

To THOMAS BOTFIELD *of Hopton Court in the county of Salop, coal and iron master, for his invention of certain improvements in making iron, or in the method or methods of smelting and making of iron.*—[Sealed 2d January, 1828.

Two leading features are proposed by the Patentee as novel in connection with the smelting of ore, which are the adaptation of a high chimney to promote a draft of air in a blast or cupola furnace, and the employment of salt or other substance containing soda in the process of smelting the ore.

The particular form of construction of the apparatus does not appear to be important, it is simply proposed to erect a high chimney contiguous to the cupola, with

channels or flues leading from the lower part of the furnace, opposite to the twyer hole, where the blast of air enters, and also from the upper part of the cupola into the high chimney, by means of which a very considerable draft will be produced through the twyer hole, and the ore become more effectually operated upon by the consequent increased heat of the furnace, than in the ordinary construction of blast furnaces.

As it is considered that the employment of heated air would improve the blast, and be beneficial to the metal produced, a small furnace or heating stove is placed contiguous to the twyer hole, and a current of air passed through it, which air, after it has become heated, is brought into the blast at the twyer hole, and is carried through the furnace by the draft of the chimney.

The employment of salt or any other material, containing soda, is confined by the Patentee to the operation of smelting the ore. The same was used by Mr. Luckock, for manufacturing iron in the puddling furnace.—(see Vol. X. page 250).—[*Inrolled in the Petty Bag Office, March,* 1828.]

To James Smethurst, *of New Bond-street, in the county of Middlesex, lamp manufacturer, for an improvement or improvements in lamps, communicated to him by a foreigner residing out of the British dominions.* —[Sealed 6th November, 1827.)

This invention is a lamp for the table, on the hydraulic or fountain principle, in which the oil is made to rise up a column to the burner, by the pressure of a descending column of some heavier fluid. The oil is placed in a receptacle near the bottom of the pedestal, from whence

it is intended to rise through a perpendicular pipe to the burner. A reservoir of water or other fluid is placed in the upper part of the pedestal, which descends by a pipe to the under part of the oil vessel, and there opening a valve upward, enters below the column of oil in the receptacle, and gradually raises it in the column up to the wick.

The principle on which this lamp is intended to act is by the difference of specific gravity between the oil and the water, or other fluid employed in the descending column, which the Patentee states, should be in the proportion of two to three. The form of the pedestal and shaft may be cylindrical, or of various other shapes, containing the reservoirs and pipes within.

When the charge of oil has been consumed, in order to recharge it, a high funnel is affixed to the top of the column, near the burner, into which the oil is to be poured, when by the superior height and consequent preponderating weight of the oil in the funnel above the burner, the water or other fluid will be forced back again into its elevated chamber, and will have no power to expel the oil from its receptacle until the high column in the funnel is removed.

The lamp is furnished with a receiving vessel for the occasional small overflow of oil, and also a vent aperture for the purpose of allowing the water to flow; and in its general appearance resembles other table lamps constructed upon the fountain principle.—[*Inrolled in the Petty Bag Office, January,* 1828.]

To John Platt, *of Salford, near Manchester, in the county of Lancaster, fustian dresser, by virtue of certain communications made to him by a foreigner residing abroad, for an invention of which he is in possession, of certain improvemements in machinery for combing wool and other fibrous materials.*— [Sealed 10th November, 1827.]

This is a machine intended to comb wool by means of two revolving circular combs or heckles, instead of performing the operation by the hands of the wool comber, as heretofore. The machinery, by means of which these rotatory combs are described as to be put in motion, is not considered as any part of the invention, for the combs may be driven by various other mechanical means beside those exhibited in the drawings; but the peculiar construction of the combs, and the relative positions in which they are placed to each other, constitutes the principal feature of the invention.

Plate III. fig. 6, is a horizontal representation of the machine, consisting of a square frame of iron, *a*, *a*, mounted upon legs, as exhibited by the end elevation fig. 7; *b*, and *c*, are two axles, upon each of which one of the circular combs *d*, *d*, are mounted. These axles *b*, and *c*, are not placed in horizontal positions, but at acute angles to the horizon and crossing each other; the circular combs, also fixed upon the axles, revolve at considerable angles from the perpendicular, and to each other, as shewn in fig. 7.

The circular combs are made in the form of ordinary slight wooden wheels with arms or spokes, the box of the wheel being attached to the axle by a screw. The points or heckles are set in the face of the rim, and they

are made to revolve in opposite directions, by means of a twisted strap *e, e,* passed over a pulley *f,* on each axle, and they are driven by a band and rigger *g,* on the end of the axle *b.*

As the combs go round, they are made to approach each other slowly; this is done by mounting the bearings of the axle *c,* in slots, which allow of their sliding, and enable the axle *c,* and its circular comb to be brought towards the circular comb on the axle *b.* This sliding movement is proposed to be effected by a worm and snail connected to the under part of the frame, [but not shewn in figure 6], which gradually moves the axle *c,* in a lateral direction, and the twisted strap *e,* connecting the two axles, and actuating *c,* from the rotation of *b,* is kept at its proper tension, when the circular combs are brought nearly together, by means of a heavy roller *h,* which hangs upon a lever *i.*

In putting this machine in operation to comb wool, the necessary quantity of wool in its rough or entangled state, is to be stuck between the points or heckles of the circular combs, and when they are put in rapid rotatory motion, the loose ends of the wool will by the centrifugal force be thrown out in the direction of radii, and will catch against the points of the heckles of the other revolving comb, by which means the fibres will be drawn out and straightened.

The operation is to commence when the combs are at their greatest distance apart, and as they slowly approach the ends or fibres of the wool will be taken hold of by the points at greater depths until the combs are brought together, by which time the whole length of the fibres of the wool will have been combed out smooth, and being then drawn from the comb, it is only necessary to remove by hand the short entangled refuse wool which

remained in the combs, and to charge them again with fresh wool for another operation.

The Patentee claims these three features; 1st, the construction of the circular combs; 2d, the oblique position in which they are placed one to the other, and made to revolve; 3d, the contrivance by which the combs are gradually brought together, and the fibres of the wool progressively acted upon.—[*Inrolled in the Inrolment Office, May,* 1828.]

To William Collier, *of Salford, in the county of Lancaster, fustian shearer, in consequence of certain communications made to him by a foreigner residing abroad, for an invention of certain improvements in the power loom for weaving.*—[Sealed 10th November, 1827.]

The principal difficulty in the construction of a power-loom arises from the necessity of obtaining from one continuous rotatory motive power, the several fast and slow movements and stationary points of the different parts of the machine. Such, for instance, as the movements of the healds by which the shreds of the warp are alternately raised and depressed; the swing of the batten at intervals, for the purpose of causing the reed to beat up the weft, and its occasional quiescent state, while the shuttle is passing swiftly across the loom to produce the intervention of the thread. These have caused a complication of mechanism which have still effected the object, but imperfectly in all the power-looms hitherto produced; and it is the design of the Patentee in the present invention, to simplify the power loom, by the adaptation of a piece of machinery to effect an intermitting rotatory action,

derived from a continuous rotatory action, which being adapted to the main shaft of the loom, gives the required intervals of rest and motion to the working parts of the loom, while the actuating power preserves a continual and uniform rotatory movement.

In the 10th volume of the First Series of our Journal, page 169, we gave the specification of a patent, granted to William Church, Esq., for "his invention of certain improvements in machinery for printing." Among various other ingenious mechanical contrivances, adapted to the construction of a letter-press printing machine, the following was described as the fifth head or division of the subjects comprehended under that patent:—An "interrupted gear motion or mechanical contrivance to effect a reciprocating action, by which certain parts of the machinery are alternately put in motion or set at rest, while the other parts of the machinery are continuing their progress." This is precisely the contrivance now proposed by Mr. Collier as an improvement in the power-loom. We cannot, perhaps, do better on the present occasion than describe it in the original words of Church's specification, from which it only differs in its present adaptation to a loom instead of its former to a printing machine.

"The interrupted gear motion, is a mechanical contrivance to effect a reciprocating action, by which certain parts of the machinery are alternately put in motion, or set at rest, while the other parts of machinery are continuing their progress. This contrivance isshewn at figs. 3, 4, and 5, (in the former Plate, but in our present Plate III, at figure 10), which exhibit the wheels in different stages of their revolution. A, is the wheel to which a continuous rotatory motion is given. B, the wheel intended to revolve with an interrupted motion. C, is a

guide having two grooves for moveable teeth in the wheel A, to slide along. These moveable teeth are shewn at *a, b,* in the periphery of the cogwheel A.

"The mode of attaching these teeth to the wheel, is by forming them at the ends of levers, which levers rise and fall upon their pivots at *c, c.* These levers are enclosed in the hollow part of the wheel by a face plate, (which is removed in the figures, in order to shew the interior,) and upon this face plate there are certain inclined planes intended to act upon the tappet, or raised parts of the levers, at *d,* and *e.*

The wheel A, being made to revolve with a continuous motion, its teeth will work in the toothed part of the lesser wheel B, until the blank part of that wheel comes round; at which time the moveable tooth *b,* is made to fall into the groove of the guide, and the curved part of the guide coming against a circular bead on the back of the wheel A, the lesser wheel B, stands still, while the larger wheel A, continues its revolution.

"Let it be supposed that in fig. 3, the lesser wheel B, has been some time quiescent, and that the larger wheel A, is revolving in the direction of the arrow, at the moment that the tooth *a,* comes into the situation there shewn, the inclined plane upon the face plate, as before mentioned, acts upon the tappet *d,* and by pressing the lever down, projects the tooth *a,* into the groove of the guide; and as the wheel A, continues to revolve, brings the guide into the position of fig. 4, at which time another inclined plane acts upon the tappet *e,* and raises the tooth out of the groove.

It will now be seen, that the teeth of the larger and the lesser wheels are in gear, and that they revolve together, which they will continue to do until the wheel B, comes into the position shewn at fig. 5. At this time

an inclined plane upon the face plate, as before described, pressing upon the tappet *d*, forces the lever down, and projects the tooth *b*, into the other groove of the guide, by which as the wheel A, revolves, the guide and the wheel B, are brought into the position shewn at fig. 3, and the tooth passing off at the end of the groove, leaves the wheel B, in a quiescent state; the segment of a rim on the periphery of the larger wheel at the back, sliding against the curved part of the guide, and thereby holding the wheel B, steady; and the teeth of A, passing over the blank part of B, until the tooth *a*, comes again into the situation of fig. 3, when the wheel B, resumes its rotatory motion."

In our remarks upon this invention we made the following observation:—"It will be perceived, that this very ingenious contrivance for obtaining an interrupted rotatory motion, (and which is, we believe, perfectly new in mechanics,) is applicable to a great variety of machines, besides those employed for printing;" and further stated, that we understood it was about to be adapted to some improved lace-making machines, which upon a rotatory principle, are designed to work by the power of steam or water.

The identity of the two inventions having been pointed out, we have only to add, that one of the said printing machines was intrusted confidentially to the care of Mr. J. Collier, engineer, of Paris, who not only immediately obtained a patent for its adaptation and exclusive use to a loom in France, to the prejudice of the original inventor, but afterwards we find the same invention introduced into this country, under the title of a communication made to Mr. William Collier, of Salford, from a foreigner residing abroad. An opposition was entered before the Lord Chancellor (Lyndhurst) against the granting of this Patent, but as the original patentee was legally advised,

that his invention (the mechanical contrivance above described) being entirely new in mechanics, though adapted by him under his patent only to a printing machine, was nevertheless his exclusive property to whatever purpose applied during the term of years first granted, the proceedings were discontinued, with the intention of taking legal steps against any one who should employ the said loom.—[*The specification was inrolled in the Inrolment Office, May,* 1828.]

To CHARLES DEROSNE, *of Leicester-square, in the county of Middlesex, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, and inventions by himself, for an invention of certain improvements in extracting sugar or syrup from cane juice and other substances containing sugar, and in refining sugar and syrups.*—[Sealed 29th September, 1830.]

THIS invention consists in a mode of decolouring syrups of every description, by means of charcoal produced by the distillation of bituminous schistus alone, or mixed with animal charcoal, and even of animal charcoal alone.

Whatever sort of charcoal it may be, it must be disposed on very thick beds, on a filter of any suitable form. The filter of itself has nothing peculiar, and does not form the object of the Patent, because it is already known and used for other purposes, but till now it has not been employed for decolouring syrups.

To obtain this decolouration, the charcoal is put in a case, in which is placed at the distance of about an inch from the bottom a metallic diaphragm pierced with a great number of holes; upon this diaphragm is placed a

coarse linen, or woollen cloth, which exactly covers it; and upon this cloth a bed of charcoal of bituminous schistus alone, or mixed with animal charcoal, or animal charcoal alone, as above said. Whatever it may be, this charcoal ought to be in a finely divided state, in order that it may be well penetrated with the syrup which is intended to be filtered. Charcoal in powder would not be penetrated by the syrup.

It has been found that charcoal reduced to the size of fine gunpowder, is very fit for this operation; if the grain is too large, the filtration would operate too rapidly. The charcoal should be lightly pressed, and then new beds of the same charcoal placed upon it, which should likewise be pressed till it has come up to the height of fifteen or sixteen inches. It may be made higher if found necessary, or it may be less, but the decolouring effect will be always in proportion to the thickness of the bed of charcoal.

When the charcoal is disposed to the proper thickness, it is to be covered with another metallic diaphragm, pierced likewise with holes, upon which is spread another clear linen cloth; upon this cloth the syrup is to be poured, which is intended to be decoloured. The syrup ought then to form a bed of several inches thick, from four to eight, although there is no precise rule.

For operating well in the filtration of syrups, the syrup ought to be clear before pouring it upon the filter, and ought to have undergone a first filtration by the ordinary means; the object to be obtained by this filtration through the thick beds of charcoal is only the decolouration of the syrups.

The syrup to be filtered ought not to exceed the consistence, which is produced by two-thirds of sugar and one-third of water; but it may be filtered at any less degree of consistency according to the result required.

When the syrup is hot the filtration operates a great deal more rapidly.

In operating on a great scale, a reservoir filled with syrup can furnish several filters at one time. The first portion of syrup which passes through the filter is always the least coloured, and by the time the colouring part combines itself with the charcoal, the effect of the last portion becomes less sensible. That portion of syrups, which retains a part of its colour after filtration, can be passed again through another bed of charcoal in another filter, and by this means it may be obtained in a great degree of purification.

Whatever the kind of charcoal used, it is desirable to mix the charcoal with about one-sixth part of its weight of water before putting it in the filter. The place of that water is occupied by the syrup which penetrates the beds of charcoal; and when the water comes at first, it has a disagreeable and salted taste when the animal charcoal is used, the water after that comes mixed with a portion of syrup, and soon after it is displaced by the pure syrup.

When the charcoal has been deprived of its decolouring effect, water is to be poured upon the filter for dissolving or displacing the syrup which may be mixed with the charcoal, the syrup then comes pure first, and after that mixed with more or less water, using as little water as possible. It is convenient to suspend occasionally the effusion of water on the upper part of the filter by shutting its cock. The syrup being heavier than the water, gains the bottom of the filter and runs first.

The syrups made with raw sugar by this process can be made as clear as water, the molasses are deprived of their bad taste, and are converted into a good kind of syrups of a clear and yellow colour.

The syrups from which it is desired to separate the colouring matter can be obtained directly from the juice

of cane, or of beet-root, or from the saccharine matter produced by the action of sulphuric acid upon the farinaceous matters, before these juices or liquids have been baked for extracting the sugar. The syrup may likewise be produced from the solution of all kinds of sugar, and of the products of inferior quality, which are obtained in sugar refining under the name of "bastards" and other sugars. The purpose of producing of syrups may be to sell them in such a state for the ordinary consumption, or to bake them for making sugar whiter than is obtained by the common process, or these whitened syrups may be used for decolouring the refined sugar, in making them filter through the loaves, instead of the earth and water commonly used.

The object of the invention being to obtain decoloured syrups by the means above described, this decolouration of syrups is always proportionate to their primitive colouration, and to the quantity of charcoal which is used.

In the carbonization of bituminous schistus there is nothing peculiar; it is produced in close vessels, as is done for producing animal charcoal, only it is convenient before the carbonization, to separate from the bituminous schistus the sulphurets of iron which are mixed with it. Instead of using the schistus, or animal charcoal of the size of gunpowder, it can be reduced to a powder still more fine, mixed with sand. In this state a given quantity of charcoal discharges the colour better than powdered less fine, but the filtration is slower, and more difficult to be regulated. The Patentee says, "having tried this method, I have given the preference to the other mode, but both of them are the object of the Patent."—[*Inrolled in the Inrolment Office, November,* 1830.]

To JOHNATHAN BROWNILL, *of Sheffield, in the county of York, cutler, for his invention of an improved method of transferring vessels from a higher to a lower level, or from a lower to a higher level on canals, and also for the more conveniently raising or lowering weights, carriages, or goods, on rail roads and for other purposes.*—[Sealed 1st May, 1828.]

THIS invention is a method of lowering or raising boats, barges or other heavy bodies from one level to another, by means of a tank, into which the boat or barge is to be floated, or a platform on rail roads; which tanks or platforms are to be suspended by ropes passed over pullies mounted on the side walls of the canal, or over the rail roads, with counter balance weights on their reverse ends. The weights are made to preponderate, or are lightened as the body to be moved is required to ascend or decend.

Plate IV. fig. 1, is a transverse section of a canal, and the apparatus adapted to moving boats or barges from one level to another, which contrivance is intended to supersede the common canal locks; *a*, is the higher, and *b*, is the lower level of the water in the canal; *c*, is the tank, which is made as a large box, with its ends so constructed as to open, in order to allow the boat or barge to be floated into and out of it. The ends of the tank are made to shut water tight when the boat is floating in it; *d*, is a barge to be lowered from the upper level *a*, to the lower level, *b*; *e*, *e*, are ropes passed over the pullies *f*, *f*, which are made fast to the box or tank, and at their reverse ends are attached to the counter balance weights *g*, *g*, which are long boxes of iron or other materials containing water; the quantity to be increased or diminished as occasion may require; they are supplied from the reservoirs *h*, *h*, on the sides of the canals by means of pipes.

It is the intention of the Patentee to waste as little water as possible in the employment of this apparatus, which he effects by forcing the end of the tank up against the wear of the upper level by means of friction rollers at the under part of the tank which come in contact with inclined planes, and when this is done, the door of the tank is opened and the barge floated into or out of it.

On lowering a boat or barge, the boat having been floated into the tank, the water is allowed to run out of the boxes or counter balance weights, which causes the tank to descend with the boat or barge to the lower level, where the end of the tank being opened, the boat is floated out into the canal and proceeds onward. The reverse action takes place on raising the tank, at which time the water is allowed to run out of the reservoir into the counter balance weights, until they are sufficiently weighted to raise the tank to the upper level.

When heavy bodies are to be raised or lowered from one level to another on rail roads, a similar apparatus is to be used, but a simple platform only is necessary, and the counter balance weights are to be filled or emptied, for the purpose of adjusting them to the weight of the body to be raised or lowered. This is proposed to be done by means of a series of boxes or tanks placed one above another, and to be severally connected as counter balance weights when occasion may require, by means of supply pipes, and when the platform is rising, the water in the lower reservoir is to be used first for filling the counter balance weights, and then the next, and so on, using as little of the top reservoir as possible.—[*Inrolled in the Inrolment Office, Oct.* 1828.]

To THOMAS MINIKEN, *of Berwick-street, St. James's, in the county of Middlesex, cabinet-maker, for his having invented or found out an improvement in the construction, making, or manufacturing of chairs, sofas, lounges, beds, and all other articles of furniture, for similar purposes, and also of travelling and other carriages and vehicles of every description for personal use.*—[Sealed 11th September, 1828.]

THIS invention is an easy chair for invalids, in which the back part is moveable upon joints, and which at the same time brings up the foot part or jambeir, as it is called, so as to form the chair into a couch or bed. The back of the chair is connected through jointed levers to the jambeir in front, and at whatever angle the back stands, at the same angle the jambeir stands also.

The parts may be moved by an attendant, or in a small degree, by the invalid person while sitting in the chair, as there are catches taking into racks connected with the arms of the chair, which may be easily raised and shifted. The contrivance is simple, and may be adapted to almost any form of chair or couch, and may be stuffed or padded, and lined according to fancy. When the back is erect, it will be simply an easy chair, and when depressed it will form a couch at any angle, or the back may be lowered and the jambeir raised into horizontal positions, level with the seat, and thereby form a bed.

The precise forms of the connecting jointed levers are unimportant, and the springs and catches by which the joints are opened, and closed, and made secure, may be such as are usually adapted to similar purposes.—[*Inrolled in Petty Bag Office, November,* 1828.

To Charles Blacker Vignoles, *of Furnival's Inn, London, and John Ericsson, of Brook-street, Fitzroy-square, in the county of Middlesex, civil-engineer, for their having invented certain additions to the engine commonly called locomotive engine.*—[Sealed 7th September, 1830.]

The contrivance which forms the subject of this Patent, is designed to enable a locomotive carriage to take firm hold of the rail, when ascending an inclined plane. It consists of a pair of friction rollers, which are occasionally pressed laterally against a central rail, or are made to pinch the rail by the power of a lever.

Plate III, fig. 8, represents two of the running wheels *a, a,* of a locomotive engine, bearing upon ordinary rails *b, b,* the wheels being affixed to the driving crank axle of the carriage, upon which axle there is a bevel toothed wheel *c,* taking into a horizontal bevel wheel *d,* for the purpose of driving the apparatus, which is the subject of this patent.

A strong bracket *e,* extends from the under part of the carriage, to which it is firmly fixed; and to this bracket a pair of friction wheels *f,* and *g,* are attached. The axle of the wheel *f,* turns in loops affixed to the side of the bracket *e,* but the axle of the wheel *g,* turns in a swinging lever *i,* which is better shewn in the horizontal representation at fig. 9.

When the locomotive carriage runs upon a level road, this apparatus is not required to be brought into action, but when moving upon an inclined plane, the lever *h,* is pressed by the conductor, which brings the wheel *g,* against the side of the central rail *k,* and causes it to pinch the rail with considerable force, by which means the

carriage obtains an additional hold upon the rail beyond that of the running wheels, which greatly assists in ascending inclined planes.

It is proposed, that the lever *k*, should have some degree of elasticity or spring, in order to accommodate any inequalities in the thickness of the central rail *k*, which will prevent any jumping movement of the carriage from partial impediments in its progress.

The friction wheels may be attached to the carriage in such a way as to allow of their pinching one of the side rails *b*, in which case the central line of rail *k*, may be dispensed with; and the actuating power for driving the carriage may be applied directly to the wheel *f*, in which case the two remaining wheels *a*, *a*, may turn round loosely upon their axle.—[*Inrolled in the Inrolment Office, March*, 1831.

To JOHN HENRY GUNTHER, *of Camden Town, in the county of Middlesex, piano forte manufacturer, for his invention of certain improvements on piano fortes.* —[Sealed 10th July, 1828.]

THIS invention is the adaptation of an additional sound board to piano fortes, which is to be made much stronger than the ordinary sound board, and to be placed above it. This board is proposed to be made of hard wood, about a quarter of an inch in thickness, but rather thinner towards the base; it is to be fastened to the framing of the instrument, and made particularly firm and capable of sustaining the tension of the strings, as the bridge and rails for the hitch pins are to be affixed to it. This and the ordinary sound board are to be connected by blocks, so that they hall both vibrate together; and it is stated that the adap-

tation of this improvement to piano fortes, whether of the horizontal or upright kind, very greatly improves the strength and tone of the instrument.—[*Inrolled in the Petty Bag Office, September,* 1828.

To THOMAS JACKSON, *of Red Lion Street, Holborn, in the county of Middlesex, watch maker, for his invention of a new metal stud, to be applied to boots, shoes, and other like articles of manufacture.*—[Sealed 13th May, 1828.]

THE subject of this Patent is a peculiar sort of small nail, or iron stud, to be inserted into the soles of boots and shoes, instead of the ordinary shoe nails. These studs consist of a cylindrical head from one eighth to a quarter of an inch in diameter, according to the size required, with a pointed stem swelling in the middle. A representation of this stud and its stem, similar to the drawing accompanying the Specification, is shewn in Plate III, at fig. 11, which sufficiently explains its form without further description.

It is proposed, in order to attach these studs to the soles of boots or shoes, that small cylindrical recesses should be made some little way in the surface of the leather, of a size suited to receive and fit closely the head of the stud. The point or stem of the stud is then to be driven into the leather, in the centre of the recess, until the head of the stud is nearly as low as the outer surface of the sole. The leather when it becomes wet will swell up tight upon the small part of the shank, close to the stud, and it will by that means, be so firmly secured in the leather as to render it impossible to be drawn out.—[*Inrolled in the Petty Bag Office, Nov.* 1828.]

To Peter Rigby Wason, Esq. *of the Middle Temple, barrister at law, for his having invented a certain improvement in the article commonly called stick sealing wax.*—(Sealed 25th September, 1828.)

The Patentee has experienced what every one who seals a letter with wax—must also have experienced the great inconvenience of not being able to keep the stick of sealing wax in a blaze, or to make the wax flow on the paper, without the trouble of several times relighting the stick; no one however that we have ever heard of before the Patentee, has suggested the simple idea of placing a a wick through the centre of the stick, which ingenious thought forms the subject of this patent.

The material or composition of which the sealing wax is made, though not claimed as new, is described as consisting of shell lac one part, vermillion one part, and Venice turpentine one part, (by weight we presume)? which are to be reduced into a mass over a slow fire, and when thus properly mixed, the portion which is to constitute a stick, is to be rolled out to its proper dimensions upon a heated copper plate; when that is done, a groove is to be formed along the middle of the stick, and a straw inserted, which is to constitute the wick. The stick of wax is then to be rolled again upon the heated copper plate, for the purpose of enclosing the wick, and being afterwards marked with such patterns or devices as may be thought desirable, on becoming cold the stick is ready for sale, or for use.

On lighting the end of this improved stick of sealing wax, the straw will sustain a small flame, which will as a taper keep the wax in a blaze, and flowing as long as may be required.—[*Inrolled in the Inrolment Office, March,* 1829.]

To William Madeley, *of Yardly, in the county of Worcester, farmer, and of Birmingham, in the county of Warwick, manufucturer, for his having invented an apparatus or machine for catching, detecting and detaining depredators, trespassers, or any animals which he denominates the humane snare.*—[Sealed 28th March, 1829.]

The Specification of this invention states, that a box or boxes of iron, or wood, are to be provided, into which is to be put a spring barrel or spring barrels, and to these are to be connected a chain, or chains. The apparatus is to be fastened to a board, and may be attached to a tree. The spring barrel, or barrels being wound up, and the key withdrawn, it is then ready to catch or detect any depredator, or trespasser, or animal.

There is no drawing appended to this Specification, and from the decription given (if it can possibly be called a description), we are unable to collect the most distant idea as to the construction of the machine for which the patent is obtained, or even to conceive in what way it is intended to act.—[*Inrolled in the Inrolment Office, May*, 1829.]

To Samuel Brooking, Esq. *of Plymouth, in the county of Devon, a Rear Admiral in the Royal Navy, for his invention of a new method or mode of making sails of ships, and other vessels.*—[Sealed 4th Sept. 1828.]

It has been found that in consequence of the strain which is given to sails in angular directions, by the pressure of the wind, they invariably stretch from corner to corner,

and bag in the middle, which causes them to be much sooner destroyed, than they would otherwise be, if the strain was supported by a diagonal seam. It is therefore the intention of the Patentee, instead of making sails by joining the breadths of canvas in perpendicular directions, to make the seams diagonally, that is from corner to corner of the square sails, and in such manner cross-wise of all other formed sails, as to give that strength and resistance in the direction of its greatest tension, which will prevent the stretching of the fibres of the material, and render the sails much more durable.

There does not appear by the Specification, to be any novelty proposed in the mode of making the canvas, or in the forms of the sails; but merely in the way in which the canvas is to be cut, and the direction in which it is to be sown together, to make the sails, which constitutes the subject of this patent.—[*Inrolled in the Inrolment Office, March,* 1829.]

To ARCHIBALD ROBERTSON, *of Liverpool, in the county of Lancaster, ship-carver, for his having invented certain improvements in the construction of paddles, for propelling ships, boats, or vessels on water.*—[Sealed 7th January, 1829.]

THIS invention is a propelling wheel, with oblique paddles, that is paddles placed in radial positions round the periphery of the wheel, but forming considerable angles with the direction of the axle.

The paddles are to be so attached to the central part of the wheel, and to the external rim, as to allow of the angles of their obliquity being changed.

The Patentee proposes to work his propelling wheels

with the paddles standing at any degree of obliquity between 40 and 70 degrees from the line of the axle; and to construct them in such a manner as shall permit their angles to be varied according to the state of the sea, and even to allow of their being brought flat upon each other against the side of the vessel, where they may act as lea boards, and guide the vessel when she is proceeding under sail.

Propelling wheels constructed in this way will not require to be made so broad as the ordinary radial paddle wheels, which is an advantage, as they will not project so far out from the sides of the vessel.

The two wheels, on the opposite sides of the vessel, are respectively to have their oblique paddles placed the reverse way to each other, in order that the oblique direction of the propelling strokes may carry the vessel forward.

It is proposed that the propelling wheels shall be so mounted as to be capable of being raised or lowered in the water, which may be done by means of a ring placed round the axle of each wheel, with a rope or chain and pulley attached to it. To accomplish this, some arrangements must be made as to the gear, by which the axles of the wheels are to be driven. The patentee has not however accompanied his specification with any drawings: the reader is therefore only furnished with his general intentions, and is left to adapt them in the best way his own experience or ingenuity may devise.—[*Inrolled in the Inrolment Office, July,* 1829.]

To William Bell, *of Lucas-street, Commercial-road, in the county of Middlesex, gentleman, for his having invented improved methods for filtrating water, and various other liquors.*—[Sealed 4th September, 1828.]

The apparatus described in this specification appears to be designed solely for the filtration of water; it consists of a vessel of any convenient shape, to be made of earthenware or other suitable material, which is to be divided into compartments, the partitions being perforated with holes like a colander, and cocks and pipes are to be supplied for the delivery of the water, which is to be filtered into the vessel, and for drawing it off after filtration; also pipes are adopted to give vent to the chambers, when the water is admitted or discharged.

Upon the first perforated partition a horsehair cloth is to be spread, and upon this pounded coke or cinders, with a layer of sand upon the top, which is to be covered with another partition, perforated with holes. Two or more of these compartments filled with coke or cinders, and sand, may be constructed in one vessel, and the water made to filter upwards, by the pressure of a high column descending to the lower compartment.

The Patentee takes considerable latitude as to the varieties of form and construction which the apparatus is capable of, but does not point out on what particular feature of novelty he founds his claim, nor can we discover any originality in the arrangement made, or in the materials employed for filtering, as the whole seems to be on precisely the same plan, as most of the filters for which patents have been taken again, and again, and reported in the previous volumns of our Journal.—[*Inrolled in the Inrolment Office, March,* 1829.

Novel Inventions.

Pocket Pedometer.—Mr. Payne, watchmaker, of New Bond Street, has recently invented an improved pedometer, of a very simple construction, for which he has obtained a patent. This instrument possesses many advantages over the pedometers of the old construction; it is made in the form of a small flat pocket watch, and registers the distance travelled by the wearer in a surprisingly correct manner, even if the steps taken are very irregular, as in running or jumping.

The same principles of construction, though slightly varied in their positions, are also adapted for registering the distances passed over by persons riding on horseback, and in a carriage. The instrument may be made so small as to be contained in a lady's locket, or added to a small watch, without much increasing its thickness.

It is intended to be worn by gentlemen in the waistcoat pocket, or it may be suspended round the neck, or in a common watch pocket.

The escapement of the pedometer is made by the vibratory movement of a weighted lever, which is put in motion by the rising and falling of the body in walking, or riding on horseback; independent of any spring or strap attached to any part of the body, as in pedometers of the old construction. In those instruments which are made for registering the number of miles travelled by a person riding in a carriage, the impelling power is derived from a pendulum, the motion of the body in a carriage being oscillatory, which will produce the same effect upon the registering dial as the lever in those instruments which are for walking. We shall give the specification of this ingenious contrivance in our next, if possible.

Improved Gun Lock.—Mr. Westley Richards, the celebrated gun manufacturer of Birmingham and of New Bond Street, London, has recently invented and obtained a patent for an im-

provement in the touch-holes and primers of percussion fire arms, which is likely to supersede the use of the copper caps, the disadvantages of which are well known to sportsmen, from the frequent accidents which have occcurred from pieces of the copper cap, by the explosion of the detonating powder injuring the eyes and hands of the person firing the gun. And also in winter, when the fingers are benumbed with cold, the caps being so small are often dropped.

In Mr. Richards' improved touch-hole, it is impossible that the sportsman can be injured by the explosion of the detonating powder, the smoke and fuze being allowed to escape from a shield only in one direction, and that in an opposite direction to the face of the sportsman. The primers too are much larger than the copper cap, and consequently are more easily handled in cold weather. They contain the smallest quantity necessary for the firing of the gun, thereby considerably diminishing the effects of the explosion, which is often a subject of complaint. The primers can at any time be recharged with detonating powder, and when in the touch-hole are quite impervious to wet. We shall publish the specification of this very shortly.

AMERICAN PATENTS.

(*From the Franklin Journal.*)

For a machine to cleanse grain from foreign substances. Jesse Neal, Middlebury, Portage county, Ohio, assignee of Phineas Pettia, of Akron, in the same county.

An inclined floor, or trough, which may be made twelve feet long and two wide, and have ledges, of eight inches in width, on each side of it, is to be so fixed in a frame that a traversing motion may be given to it, endways, by means of a crank, or pitman. Upon this floor the grain is to be rubbed, which operation is thus effected. Pieces of timber, called followers, are to be cut in lengths

equal to the width of the trough; they may be six inches wide, and five thick; these are to be laid across the trough about four inches apart, and retained in their places by blocks of wood projecting downwards from an upper frame, and passing between their ends.

The grain to be cleaned is fed on to the upper end of the trough, and when the proper motion is given the grain descends, passes successively under all the followers, and at the bottom is received upon a screen.

The claim is to a machine constructed on the general principles of the foregoing, which admits of variations in the particular arrangement, whilst the machine may be essentially the same.

For an improvement in the loom for weaving casinet and other cloths. James Hammond and John M'Clelland, Williamsport, Washington county, Pennsylvania.

This improvement consists in making such a connexion between three or four looms that one may with facility work the whole. The general construction of the looms is unchanged, but the three or four which are to be worked together, stand behind each other, in one common frame. Jointed connecting rods unite the stays of each loom, by passing through mortises made in the swords. One pair of treaddles is made to work all the harness, by lines passing over their respective carriages; and so of the plucking stick, and other parts.

The claim is to "the manner of connecting together three or more looms by the connecting rods, in such a manner that one weaver can work many looms together with the same facility as he has heretofore been able to work one. Also the cords of the prickers, and the mode of constructing the carriages for the pulleys."

For an improvement in the ordinary machine for thrashing wheat, and other small grain. Granted to John Stowits, Gorham, Ontario county, New York.

The improvement consists in the variation from the thrashing machine now used, in this respect; those now in use are fed near the bottom of the machine, and are so con-

structed that the main cylinder catches the straw at the owest point in its revolution, and, of course, throws the traw, grain and chaff upwards; they then fall together n a confused mass; this renders it very troublesome to the person employed in separating the refuse from the grain, and while the machine is in motion the place he must occupy is filled with dust; the velocity of these machines is such, and their power so great, that grain, and even stones, sticks and weeds, will greatly annoy, and sometimes injure, the person so employed.

By this improvement all these objections are avoided; a concave piece of wood, filled with teeth of proper size, is placed at the *top* of the machine, and the cylinder also filled with teeth plays into this, and the straw to be thrashed is put on an apron leading to the top of the cylinder—the course of the straw is therefore downward, and it falls on a seive. A blower in the lower part of the machine, fixed as in the ordinary fanning mills, separates the refuse from the grain. The straws of ordinary length, by the force which they acquire in the revolution, are thrown beyond the main body of the grain.

JOHN STOWITS.

APPENDIX

To the Report of the Select Committee of the House of Commons, on Patents.

Papers delivered in by John Farey, Esq.

[*British Law of Patents for Inventions.*]

(continued from p. 48.)

Mr. Joseph Bramah made application to Parliament for an Act to extend the term of his patent of 1784, for locks for doors, &c. but the bill was withdrawn, in consequence of opposition, after some evidence had been taken before a Committee. In 1798.

An Order of the House of Commons, respecting notice of

application to Parliament, for any Act to prolong the term of any letters patent.

The notice which is to be inserted in the London Gazette, must have prefixed to it in capital letters, the name by which the invention is usually distinguished; and it must contain a distinct description of the invention, with a statement of the term of the duration of the patent. 1801. 30 June.

An Act for enabling Matthias Koops to assign the benefit of an invention for making paper from straw, and other substances, to a greater number of persons than is limited by his patents for the invention.

The patents for England and for Scotland, granted in 1801, contained the usual proviso, that the privilege should not be transferred or assigned to more than five persons, nor used in any way contrary to the 6 Geo. I. As it was necessary to erect expensive buildings, and a steam engine, to carry on the new manufacture of paper, it was therefore thought expedient to enlarge that proviso. The Act allows the patent rights to be transferred or assigned to any number of persons not exceeding sixty. A Public Act.

This Act was cited during the trial of Hesse *v.* Stevenson, in 1803, respecting the property in Koops' patent rights, which he assigned to certain directors, and they had sold shares under this Act to a number of persons, and had established a large manufactory; but as the method failed totally, some of the shareholders endeavoured to get back the purchase money that they had paid to the directors, on the ground that Koops had been a bankrupt some years before, and had not obtained a certificate at the date of his patents, therefore he had no power to assign to the said directors, and could not empower them to sell shares. It was held, that this Act did not give Koops any better title to the patent rights than he had before, and that they belonged to his assignees of bankruptcy, consequently that the sales having been made without their concurrence, were void. 1801. 41 Geo. III. c. 125. of local and personal Acts.

An Act for vesting, for a limited time, in Edmund Cartwright, clerk, the sole property in certain machinery by him invented for wool-combing preparatory to spinning; for which patents have been granted to him; viz. a patent, for England, in 1790, for dressing, heckling, combing and preparing hemp, flax, wool, hair, silk and cotton; also another, in 1790, for improvements on and additions thereto; and a corresponding patent for Scotland. Also another patent for England, in 1792, for improvements upon, and additions to his machinery aforesaid, for manufacturing wool, hemp, flax, &c. from the raw state, till made into yarn, twist, ropes and cables, and till

perfected in the loom and cut for raising a pile. Specifications were duly enrolled. The patent rights being infringed, he commenced a suit at law, at great trouble and expense, whereby, and also by the expenses of bringing the inventions for wool-combing to perfection, he has become involved in debt, which he cannot repay, nor receive a recompense without a prolongation of the terms of the said patents, so far as relates to wool-combing.

§ 1. This Act vests in E. Cartwright, the sole right to all his machines and inventions contained in the said patents and specifications, which relate to the business of wool-combing, for fourteen years from the passing of the Act. § 2. Mr. Cartwright to enrol a new specification of his said inventions for wool-combing, without being obliged to use the same words and figures as in the former specification, but may use such words and such figures as are most proper for describing the invention in its improved state; and if he shall describe any better practical applications of the principle of the invention than have been generally practised, so as not to vary from such principles, it shall not weaken the claim of the said Edmund Cartwright to be considered as the inventor of such principles, notwithstanding that such explanation may vary from the former specifications. § 3. The Act not to hinder the use of wool-combing machinery, not then the invention of Edmund Cartwright, as described in his specifications, and the new one to be enrolled. § 4. The privilege not to be transferred to more than five persons. § 5. All claims and liens of Mr. Cartwright's creditors, and others on the property in his said patents, shall remain in force as long as the Act, or until the same be discharged. § 6. A patent to William Toplis, in 1793, for machinery for combing and preparing wool for spinning, shall not be affected by the Act. § 7. All agreements and licences for the use of the patents (the conditions of which have been fulfilled) to be continued in force as long as the Act. §. 8. All objections in law against the patent to be competent against the Act, except as to the term. § 9. A Public Act. In 1809, Mr. Cartwright received a reward of £.10,000 from Parliament for his inventions. 1801. 41 Geo. III. c. 133, of local and personal Acts.

An Act for prolonging the terms of certain patents assigned to Henry Fourdrinier, and Sealy Fourdrinier, for the invention of making Paper by means of machinery.

The patents were granted to John Gamble, in 1801; and for improvements, in 1803; also corresponding patents for Scotland and for Ireland, in all six patents; to which specifications were duly enrolled. In 1804, they were assigned by J. Gamble to

H. and S. Fourdrinier, who had established such machines in actual use, and also workshops for making the machines; but at such great expenses, as could not be repaid without an extension of the terms of the patents.

§ 1. The Act vests the sole right of the improved machines in H. and S. Fourdrinier and J. Gamble, for 15 years from the passing of the Act. § 2. A scale of prices, fixed by the Act, for licences to use the patent machines, until there shall be a certain extent of such machinery in use; and then a reduction of price to take place according to another scale on all existing licences, and all future licences. § 3. No more than the scale of prices to be henceforth paid by those who had previously contracted for licences on higher terms; and all such licences to continue in force as long as the Act. § 4. The Act not to hinder the using any invention different from those described in J. Gamble's specifications, and in the new ones, to be enrolled, viz. § 5. One of the parties, to enrol in England, Scotland and Ireland, new specifications of the invention and machine in its most improved state, within six months after the passing of the Act, but not to be obliged to use therein the same words or delineations as in the former specifications; having liberty to use only such words and delineations as should be proper for describing the invention in its most improved state, and in what manner the machine was to be made and used, and how the work was to be done thereby; also that they should therein explain such better practical application of the original and improved principle of the machine, and all the improvements thereof, as they then used and practised. § 6. Every objection to the validity of the patents, and to the sufficiency of the specifications enrolled as aforesaid, to be of the same force as if the Act had not been passed, and as if the specifications required by the Act had been enrolled in due time, instead of the former ones respectively, except as to the term. § 7. The privilege not to be assigned to more than five persons. § 8. A Public Act.

Observations:—The original invention of the paper machinery was made in France, and communicated to Mr. Gamble, who took out the patents in this country, but the invention was very greatly improved by Mr. Donkin, whom the patentees employed to bring the invention to bear, and execute the patent machinery. Messrs. Fourdrinier became bankrupt in 1810, owing to the great expenses they incurred; but afterwards the machines were made very complete in the hands of their assignees, and have been brought into general use, with great advantage to the public. In 1817, the assignees were obliged to proceed in Chancery against several infringers, who submitted

without coming to a trial. In 1819, an action Bloxam v. Elliot was tried in the Court of King's Bench, and the assignees gained a verdict. In 1825, another action, Bloxam v. Elsee was tried in the Court of King's Bench, and a verdict given for the assignees; but in 1827, the court directed a new trial, which the assignees would not pursue, on account of the great expenses they had incurred in the previous trials; and the opinion of the court, when the new trial was ordered, being decidedly against the validity of the patents, they were in effect set aside. 1807. 47 Geo. III. c. 131. s. 2. of local and personal Acts.

A standing order of the House of Lords, respecting bills for extending the terms of letters patent. That no bill, for the purpose aforesaid, shall be read a third time in this house, unless it shall appear that the letters patent, of which it is intended to extend the term by such bill, will expire within two years from the commencement of the session of parliament in which the application for such bill shall be made, and unless it shall appear that the application to parliament for extending the term of the letters patent is made by the person, or by the representatives of the person, who himself originally discovered the invention for which such letters patent were granted by his Majesty; and that the knowledge of such invention was not acquired by such person as aforesaid, by purchase or otherwise, from the inventor or owner of the same, or by information that such invention was known and pursued in any foreign country.

Note.—Mr. Crosley's application to parliament in this present session (1829) was withdrawn, in consequence of this order. But Mr. Langton's, which was also within the terms of its prohibition, was passed into an act.—1808, 28th March.

An act for granting certain powers to a company to be incorporated by charter, to be called "The Gas Light and Coke Company," for making inflammable air for the lighting of the streets of the metropolis, and for procuring coke, oil, tar, pitch, asphaltum, ammoniacal liquor and essential oil, from coals.

Note.—This was the first legislative encouragement to the public adoption of the then new invention of illuminating towns by gas, which has since been brought into general use in Britain, with great advantage.—1810. 50 Geo. III. c. 163.

An act for granting the sum of £50,000, to John Palmer, Esq. in consideration of the public services performed by him; videlicet.

In the accommodation afforded to the public, and the benefit derived to the revenue, from the adoption of his plan for the conveyance of the mails. This is not to affect his annual pension of £3,000. out of the revenues of the post office, ordered in 1793.—1813. 53 Geo. III. c 157.

An act for securing to James Lee and the public, the benefit of his invention, of certain new methods of preparing hemp and flax, by enabling him to lodge the specification under certain restrictions.

'Mr. Lee had patents for his invention in 1812, in England, Scotland and Ireland, with provisoes, that specifications should be enrolled within fifteen months of their dates respectively; but as foreign agents might obtain copies thereof, if so enrolled and send them abroad, so as to enable foreigners to use the invention, before the King's subjects could by law use the same; § 1. The patentee was required by the act, instead of enrolling his specifications, to deliver the same to the Lord Chancellor within fifteen months from the date of the first patent, with an affidavit by the patentee, that the whole of the invention and the method of using the same was therein described. The specification and affidavit shall be enclosed in a cover, under the seal of the Lord Chancellor, and lodged in the office of one of the Masters of Chancery, to be nominated by the Lord Chancellor; which master is to preserve the same. § 2. The said packet not to be removed from the custody of the said master on any pretence, except by order of the Lord Chancellor, who may call for and open the same whenever it may be necessary, on account of applications for patents for inventions of a similar nature, or on account of any trial at law; and after such use being made, the packet shall be sealed up again and deposited with a master as before. § 3. Two copies of the said specification, with affidavits by the patentee that they are true copies, to be delivered under cover sealed by the patentee, one to the Lord Chancellor for Ireland (who shall deposit the same in the custody of one of the masters in Chancery in Ireland) and the other to the Lord Chief Baron of the Exchequer in Scotland, (who shall deposit the same in the custody of the King's Remembrancer in the Exchequer in Scotland.) § 4. And the said packets so deposited shall be kept as before directed for the original, and may be opened and examined, when necessary, by the Lord Chancellor in Ireland, or Lord Chief Baron in Scotland, and then sealed up again and deposited as before. § 5. The several packets so deposited shall be kept as aforesaid until the expiration of seven years from the passing of the act, and shall then be enrolled by the persons having custody of the same, and by the said patentee or his executors, administrators or assigns in the Courts of Chancery in England, Scotland and Ireland as directed by the patents respectively. § 6. The delivery of the said specifications, and the enrolment thereof within four months after the expiration of the said term of seven years, as before directed, shall be deemed as effectual

a fulfilment of the provisoes in each of the patents as if they had been enrolled within the time stated therein. § 7. A docquet or abstract of the said several letters patent, containing the date, and the words in which the invention is therein described, shall, within four months from the passing of this act, be enrolled in place of the specifications. § 8. In case a specification of the invention shall not be duly enrolled, in pursuance of each patent, within four months after the said term of seven years from the passing of the act, the patent shall become void. § 9. A public act.

Note.—Mr. Lee's invention was tried on a large scale, but did not prove successful; it was intended to prepare flax for spinning, without previous dew rotting or water rotting. The manufactory was destroyed by fire, and has not been renewed. —1813. 53 Geo. III. c. 179. of local and personal acts.

An act to ascertain the tonnage of vessels propelled by steam power.

In taking the length of the vessel in order to calculate the tonnage, (according to a rule which is prescribed in the act,) the length of the engine room is to be deducted. No goods to be stowed in the said engine-room, except fuel for the voyage; and if any goods are so stowed, the vessel shall not be measured according to this act, but after the usual manner.

This act has been a considerable encouragement to steam navigation, as it reduced all the port and harbour charges upon steam vessels, much below what they were before.—1809. 59 Geo. III. c. 5. port and harbour charges.

A bill was brought into the House of Commons, to conceal the specifications of all inventions for which patents are granted, from public inspection, in order that the inventions might not be sent abroad. It was thrown out.

Note.—It was stated by the Lord Chancellor Eldon, in the case of Koops ex parte in Chancery in 1802, that a clause to the same effect had been inserted in a bill before Parliament in 1801, on the motion of Lord Thurlow, seconded by Lord Rosslyn; but it was universally rejected, and he, Lord Eldon, thought on very proper grounds.—About 1819.

A petition was presented to the House of Commons, praying for some amendments in the law relative to patents for inventions; and a bill was brought into the house for that purpose.

One of this principal provisions was to give security to the inventor, from the time of his first application for a patent, during a certain time allowed for making experiments before the date of the patent. Also to permit an invention to be assigned, and the patent to be afterwards granted to the assignee. It was thrown out on the second reading.—In 1822.

A machine was ordered to be made at public expense, under the direction of Charles Babbage, Esq. and according to his invention, for calculating and printing Mathematical Tables of series of numbers.—In 1825.

A petition was presented to the House of Commons, stating the defects of the present law relative to patents for inventions, and praying a revision and amendment thereof; printed in the journals of the House.—In 1829.

Mr. Samuel Crosley applied to Parliament to extend the terms of a patent for an improved gas apparatus assigned to him, but granted in 1815 to Mr. Samuel Clegg, the inventor. The bill was withdrawn after the second reading, because it was found that the standing order of the House of Lords, in 1808, would have prevented the bill being read in that House; the prolongation not being for the benefit of the original inventor.—In 1829.

An act for vesting and securing to John Stephen Langton, Esq. his executors, administrators and assigns, certain profits and emoluments, for a limited time.

This act is for extending the term of John Stephen Langton's patent of 1825, for his improved method of seasoning timber and other wood.

The patent having 10 years of its term unexpired, the passing of the bill through the House of Lords, was contrary to their standing order of 1808.

The preamble of the act recites the description of Langton's improved method of seasoning timber and other wood; and states, that whereas the said invention will be of vast importance to the public service, and of general utility, provided timber so seasoned shall prove as sound and durable as wood seasoned after the usual manner; but the ascertainment of that fact, (particularly for the purposes of ship-building) will require a very great outlay of capital, and a long period of time must elapse, before such proof can be established. In order therefore to encourage the said John Stephen Langton, his executors, administrators and assigns, to establish his invention, and in order that he may be recompensed for the same, and that the use thereof may be immediately laid open on fair and equitable terms, it is enacted, That such profits as are after stated in the act, are granted to the said John Stephen Langton, his executors, administrators and assigns, for the term of 21 years from the passing of this act, from all persons throughout His Majesty's dominions, except Ireland, who shall directly or indirectly use his said method of seasoning timber, or shall counterfeit the same. The act grants liberty to all persons to use the said method, on giving seven days notice thereof to John Stephen Langton, his executors, administrators or assigns; such

persons using the method, to pay to John Stephen Langton, monthly, during 21 years, at the rate of sixpence on every twenty shillings gross value of all timber and wood so seasoned by them during each preceding month.

The vessels used for containing timber to be seasoned according to the said method, to be closed under the lock and key of John Stephen Langton. The said John Stephen Langton to attend to see timber or wood put in and taken out of such vessels at times specified by the Act, and to be paid for such attendance at the rate of two shillings for every visit not exceeding an hour; and to pay a penalty of five pounds for every default of attendance, to the person injured thereby; the said John Stephen Langton to have access to the premises of persons using his method, at all seasonable times. This Act not to extend to any method of seasoning timber publicly used in Great Britain before 1826, or to any other than that method which is described in the Act; nor to any timber seasoned in His Majesty' dock yards, or by the Board of Ordnance. The act to become void if 500 tons of shipping, wholly or chiefly built of timber seasoned by the recited method, have not been launched within three years from the passing of this act.

The said Stephen Langton is empowered to recover the sums provided to be paid to him by this act, whenever the payment thereof is neglected for seven days after he has made lawful demand, by distress and sale of the goods and chattels of the persons neglecting so to pay him, under warrant of two or more Justices of the peace; and if such persons refuse to pay the sums due, the said John Stephen Langton is empowered to stop their practice of his said method until the payment shall be made. Appeals may be made from the decisions of the Justices of the peace to either of the Courts of Record at Westminster; and in case it shall be proved there that John Stephen Langton is not the first and true inventor of the "combination of the apparatus or machinery, &c. for seasoning wood, and proving when the same is seasoned, as such combination is described in the preamble of the act," then the proceedings to be quashed, or John Stephen Langton, his executors, administrators or assigns, to be nonsuited. All deeds of agreement between John Stephen Langton and other persons, relating to the benefits secured by this act to him, his executors, administrators and assigns, to be inrolled in the Court of Chancery of England or Scotland respectively. A Publlc Act.

NOTICE OF NEW BOOKS.

Remarks on Canal Navigation, &c. &c. By William Fairbairn, Engineer. London, Longman and Rees: Manchester, Robert Robinson, 1831.

The importance of great works is not to be measured by their practical utility alone, but by that which may almost be termed their moral influence, for they act as examples to produce other great works, and to urge on improvement throughout a whole country. Such for example, has been the effect in Switzerland of Bonaparte's celebrated road over the Simplon. It is not merely that it has made an easy communication for travellers and merchandise, to pass from the interior of France into the very heart of Italy, but it is, that by making traffic more easy, it has increased and spread it; by drawing the greatest portion towards its own province, it has compelled other provinces to make roads, and to follow up the course of improvement, that they might not dwindle into insignificance. Such is also the effect, that the brilliant success of the Manchester and Liverpool railway is beginning now to have in this country, and universal and rapid as our system of communication is already, it bids fair to make it still more universal and rapid.

Until lately railways were almost confined to coal districts, and to that species of traffic which required only moderate speed. So long, therefore, they did not invade

the province of canals and canal proprietors, feeling no dread of diminution in their profits, had no motive to improve their own system of conveyance. But now it appears, that railroad conveyance has far wider limits of applicability; how far that may extend, it is yet premature to pronounce. But the impulse is given, and will be followed up, and the owners of canal property begin now to feel it time to awake from their long rest, and exert themselves to the utmost, to improve their means of conveyance, and meet the growing competition of railroads.

When Mr. Lymington first tried his steam-boat on the Forth and Clyde canal in 1802, it was opposed by some of the proprietors of the canal, under the idea that the undulation of the water produced by the motion of the paddle-wheels would injure the banks of the canal. That dread has continued up to this time, and has been one bar to the introduction of steam boats on canals.

The object of Mr. Fairbairn's publication is to shew, by the results of some experiments, of which he gives an account, the practicability of using steam boats with stern paddles on canals, without injury to the banks, and further to shew, by calculations, the superior economy of steam to horse power for canal conveyance.

The attention of Mr. Fairbairn was directed particularly to this subject in January, 1830, by Mr. Grahame of Glasgow;

"Who had then (says Mr. Fairbairn) so far succeeded in drawing the attention of the managers of the Forth and Clyde canal, and of the Union canal, to the superior advantage of steam power, that the committee of each of these companies had contracted for the construction of a steam boat, to ply on their respective canals in that branch of business, which appears most favourable for the introduction of steam power in each."

In the spring of 1830, Mr. Grahame made an experiment on the Forth and Clyde canal, to try the effect of drawing two light gig-built boats, lashed together side by side, at a greater speed than is usually given to the common passage boats. The following is an abstract of the account published in the papers of the day, by Mr. Grahame :—

"One of the boats was 33 feet long, and 4½ feet broad at the widest part; the other was 30 feet long and 4 feet broad. Their distance apart at the head, where the keels cut the water, was 4 feet 9 inches, and their distance apart about the centre of the boats was 18 inches.

"The two boats (strongly fastened together by cross planks), were drawn by 1 horse, at first at the rate of about 8 miles per hour; and they made about as much surge in the canal as the common passage-boat did, moving at its usual speed of a little more than 5 miles per hour.

"Afterwards the double boat was drawn at the rate of 10 and 12 miles per hour, and made less surge than at 8 miles per hour.

"The two boats contained 9 or 10 people.

"After this, the larger of the two boats was detached, and 2 miles out and in, on the canal, were done at 15 miles per hour; the surf or surge was very slight.

"In both trials, viz. of the double and single boats, they were brought up almost instantaneously.

"It was found that when the boats were moving very fast, it required less labour of the horse in proportion, and there was less surge than when the boats were moving at a less volocity. The best explanation of these matters,' says Mr. Grahame, 'is by the supposition, that at a high rate of velocity, the flat boat rises towards the surface, and skims over, instead of cutting the water. The moment the towing line is slacked off, the boat sinks to her usual depth, and of course brings

herself up immediately, owing to the increased resistance of the additional column of water which she must cut. On the other hand, when moving at a quick rate, and skimming near the surface of the water, the labour of the horse is diminished in proportion to the diminution of the column of water displaced, and the wave or surge is diminished in like ratio.'"

On this Mr. Fairbairn adds—

"The diminution of wave or surge consequent on very rapid motion through the canal, stated to have been observed by Mr. Grahame, appeared very anomalous, and contrary to all theory. And was by many persons present at the experiment, considered as *ideal.*"

For ourselves, we see no reason to consider the fact as at all astonishing. Every boy who has ever made a model of a ship, and amused himself with towing it by a line, knows that if he moves at all quickly, he pulls his model almost out of the water, and it skims along the surface, with hardly any part of it immersed. The power of a horse to draw a boat 30 feet long and 4 feet wide, bears about a fair proportion to the power of a boy, to draw a boy's model. Such a boat would be perfect play to a strong horse.

"In the month of June (continnes Mr. Fairbairn) a light gig-shaped boat, built by the Ardrossan Canal Company, was launched on that canal."

The following is an abstract of her first voyage to and from Paisley:—

"The boat was single, gig-shaped, 60 feet long and 4½ feet breadth of beam; drew, when light, 10 inches, including a deep keel.

"She was drawn by 1 horse, from Port Eglinton to Paisley, 7 miles, in 1 hour 7 minutes = 6.3 miles per hour. The greatest speed was 1 mile in 9 minutes, = 6.6 miles per hour. The least speed was 1 mile in 11 minutes, = 5.45 miles per hour.

"A very high wave preceded the boat, 80 or 90 feet a-head, causing overflow at the bridges and narrow parts. (Note. The breadth of the Ardrossan canal, at the bridges, is 9 feet). The surge astern was slight. The horse was very much exhausted.

"The same boat returned, drawn by two horses, (with 24 persons on board, 4 of whom were boys) in 45 minutes = 9.4 miles per hour. But there were stoppages, owing to one of the horses getting frightened. The greatest speed was nearly 11 miles per hour. There was no front wave, except at the bridges, and no surge astern, and the greater the speed was the less was the surge."

Mr. Fairbairn says—

"From the above it will be seen, that the question of surge and injury to the banks, so much feared, and so strenuously insisted upon by the parties opposed to improvement, was for ever set at rest by the voyage made by the light gig-boat, in one of the narrowest canals in Scotland."

This we think is too wide a conclusion. The trial shewed what need never have been doubted, viz. that a long narrow boat drawing very little water, could be towed at a very great speed, without creating such a surge as to injure the banks of the canal; but the trial did not set at rest the main 'question', viz. Whether a steam boat of a proper size to carry one or two hundred passengers, and having the same sectional area under water, at a great speed as at a low one, will move rapidly through a canal, without creating so much surge as to injure the banks of the canal.

"The Swift twin boat 60 feet long, 8½ feet wide, fitted for 50 or 60 passengers, was afterwards built by Mr. Hunter, of Glasgow, for Mr. Grahame, and went on the 7th July, from Port Dundas, to Edinburgh, 56½ miles in 7 hours, 14 min.=

average speed, nearly 8 miles per hour, including stoppages for locks, bridges, &c. &c. of which there are a great number. The load was, 33 men and their luggage.

On the 8th the boat returned, with the same load, in 6 hours 38 min.; average speed, nearly 9 miles per hour. (Note, a head wind both days.) When the boat was moving 6 or 7 miles per hour, there was great swell before, and strong surge behind, bearing off towards the banks, and the horses were much distressed.

At 9 miles per hour, the swell and surge were diminished almost to nothing, and the horses were easier."

After these trials, says Mr. Fairbairn,

"I arranged a variety of experiments, for the purpose of ascertaining the force expended in moving forward the twin boat (Swift,) at various rate of speed, and with various weights; and also the effect of the application of side and centre paddles, worked by men placed in the twin boat.

"The result of these experiments shewed, that the resistance to a body, drawn along a line of water confined within the banks of a canal, did not appear to increase in the ratio laid down in theory, and that while at a low rate of velocity, viz. at and under six miles an hour, the resistance to the progress of the boat, on a broad line of water, was considerably less than on a narrower line; on the contrary, at a high rate of velocity, say above 10 miles an hour, the forces necessary to the propulsion of the boat on a broad and narrow line of water, appeared to be the same, if the advantage was not rather in favour of the narrow line."

The following is a summary of Mr. Fairbairn's experiments, with the *Swift* drawn by horses. She was provided with a dynamometer to draw by, and loaded so that the gross weight of the boat and cargo was 5 tons, 16 cwt. 1 qr. 14lb.

The first experiment was made with 2 horses, and the following table is the average of 14 trials :—

No. of Experiments.	Miles per hour.	Force of traction.	Horse power.	Remarks.
1 and 2 - -	4.17 -	44.20 -	0.419 -	Surface of water smooth.
3 and 4 - -	6.20 -	111.25 -	1.839	A rippling wave towards the sides of the canal.
5 and 6 - -	7.57 -	204.92 -	4.136 -	Surge astern.
7 and 8 - -	8.64 -	268.25 -	6.180 -	Surge increased.
9 and 10 -	8.02 -	254.85 -	5.450 -	No change.
11 and 12 -	8.34 -	313. - -	6.961 -	More surge.
14* - - -	14.06 -	352.6 -	18.2 -	Surge greatly diminished.

* Note in No. 14.—The gross load was only 61 cwt. 2 qrs. 7lb.

It appears from the above trials, that the force or resistance, under the speed of 9 miles per hour, increased faster than as the squares of the velocities; for,

$(8{\cdot}02^2 =)$ 64·32 square of velocity : $(8{\cdot}34^2 =)$ 69·55 square of velocity :: 254·85 force : x — which gives $x = 275{\cdot}5$.

But the real force for 8.34 miles per hour, was by the experiment, 313 vide the table.

On the contrary, at great velocities, the resistance was less than as the square of the velocities; for,

$(8{\cdot}34^2 =)$ 69·55 sq. vel. : $(14{\cdot}06^2 =)$ 197·68 sq. vel. :: 313 force : x which gives $x = 889$ .5. But the real resistance by the dynamometer, was 352·6.

Note.—The above experiment was made on the Forth and Clyde canal, which is 63 feet wide, and 9 feet 9 inches deep.

Experiment II. On the Monkland canal, which is 40 feet wide, and 5 feet 4 inches deep.

In these trials, the proportion of the forces to the time and distance, was less than in the first experiment on the Forth and Clyde canal. The effects as to swell and

surge were as in the first experiment, viz. There was no surge at velocities under 5 miles an hour. It increased up to 7½ miles per hour, and then diminished again, as the velocities were increased.

Experiment III, on the Forth and Clyde canal. The gross weight of the boat and cargo was 109 cwt. 2 qrs. 10lbs.; mean draught 15½ in.

The boat was drawn by 3 horses at 11.2 miles per hour. and at that speed the force of traction was 473. There was no surge in front; a slight ripple astern, wind favourable.

When the boat moved on the Monkland canal (which is narrower and shallower than the Forth and Clyde), at 11.11 miles per hour, the force of the traction was less in proportion, than when the boat moved through 11.2 miles per hour on the Forth and Clyde. The wind being favourable in both cases.

Mr. Fairbairn found that the force of traction, when the boat moved 11½ to 12½ miles per hour, was very little greater than when it was drawn 7¼ miles per hour: the increase being only about 1-7th. viz. at 7.28 miles per hour, the force was 378.5 while at 11½ and 12½ miles per hour, the forces were 433.4, and 439.3 by the dynamometer.

Mr. Fairbairn tried also some experiments with the Swift on the Forth and Clyde canal, with paddle wheels worked by men.

He first tried a paddle wheel working in a trough, extending longitudinally down the middle of the boat) 2½ feet broad at the bows, 22 in. amidships, and 3½ feet broad astern. The paddle wheel was 7½ feet diam. 2 feet wide, worked by 12 men. The gross weight of the boat, cargo, draught 16 inches, paddle boxes, &c. 112 cwt. 3 qrs. 23lbs. mean.

The following is part of a table of the experiments :—

Miles on Canal.	Time.		Miles pr hour.	Revolution of Paddles.	Remarks.
	m.	*s.*			
One-eighth	1	36 -	4.68 -	44	No sensible surge.
	1	35 -	4.73 -	62	Ditto.
	1	36 -	4.68 -	55	Ditto.

The Swift was also tried with paddles on the side of the boat; the area of each paddle being the same as those on the wheel used in the centre trough in the first experiment. 16 men to work them, gross weight, 109 cwt. 2qrs. 20lbs. mean draught 15¼ in. The results were as follow :—

At 5.7 miles per hour, with the wind, there was no surge, the paddle working without much agitation in the water

At 6.5 miles per hour, still no surge.

At 7.03 miles (gross weight only 81 cwt. 3 qrs. 24lbs.) with the wind, there was no sensible surge.

Mr. Fairbairn says, that in trying the experiment with the single paddle wheel in the centre,

" The agitation in the water produced by the wheel working in its trough, never approached the banks, but was discharged from the stern, running like a mill stream, in an extended line, for some distance in the middle of the canal.

The results (he says) were such, as to induce me to recommend, and the Forth and Clyde canal committee, to agree to build a light twin iron steam passage boat, to ply between Glasgow and Edinburgh.

" The business I now had in hand, was to ascertain how, and what cost, the object I recommended the Forth and Clyde canal committee to pursue, could be obtained. It was not an abstract question of practicability, but how far a very high rate of velocity might be *advantageously obtained.*

" In pursuit of this view, a twin steam boat, the Lord Dundas, has been designed and is now clearly completed.

"The following are her dimensions.

Length 68 feet.

Breadth of beam, 11½ feet.

Depth 4½ feet, width of the tunnel or wheel trough extending longitudinally down the middle of the boat, 3 feet 10 in. It is wider at each end (viz. bow and stern) than at the middle. Depth of tunnel, 3½ feet. Paddle wheel, 9 feet diam. engine 10 horse power, on the plan of locomotive engines, to make about 50 or 60 strokes per minute, gross weight, including engine, paddle, wheel, &c. 7 tons, 16 cwt. weight of boat, exclusive of machinery, 2½ tons, draft 16 in.

Fitted for 100 to 150 passengers.

Now, as to the superior economy of steam conveyance on canals, Mr. Fairbairn says, the annual expense (in the passage between Port Dundas and Port Hopetoun), of delivering 38 tons daily at Port Hopetoun, and 38 tons daily at Port Glasgow, is thus:—

	£.	s.	d.
Wages of crew - -	364	3	4
Trackage - - - -	676	15	8
Track ropes - - -	81	15	10
Total	£ 1,122	14	10

That is 11¼ pence per ton, for 56 miles, or under ¼ per ton per mile. The passage takes 18 to 20 hours, and to have a delivery each day. The Company trading between those 2 parts employ 4 boats, navigated by two men each, and a spare boat to give time for loading and unloading.

Mr. Fairbairn calculates that the work done as above by 4 boats, can be done by two steam boats, at an annual cost of £660 for the steam power, instead of £758 11 6 for trackage as above, and £182 1 8 for crew, instead of £364 3 4, saving altogether upon the delivery of 11,856 tons annually, £280 13 2.

He computes the cost of the 10-horse engine annually, thus:—

	£.	s.	d.
"Wear and tear on £980, at 10 per ton - - - - -	98	0	0
Coal, 400 tons, at 5s. 6d. per ton, reckoning $2\frac{1}{4}$ cwt. per hour, for a 10-horse engine, the passage of 56 miles to be made in 6 or $6\frac{1}{2}$ hours - - - - -	110	0	0
Engineer and assistant - - -	107	0	0
Oil, &c. - - - - - -	15	0	0
	£330	0	0"

This is more than the annual expense of a 10-horse locomotive engine.

Mr. Fairbairn appears to consider the twin-built boat as peculiarly adapted to high speed, and to the conveyance of passengers on canals. But for carrying goods and luggage, where the boat has to pass from a canal into the open sea, he gives the preference to a boat constructed with stern paddles.

"It is quite clear (he says) that whatever may be the comparative merit of side paddles, such paddles are out of the question in canal navigation; as independent of their liability to be injured in the locks and on the banks of the canal, they must contract the bearings of the vessels to which they are attached, and make them of very small burden. The centre paddle or twin boat principle, (that is the paddle working in a longitudinal central canal that divides the boat in two halves) also contracts the bearings of the vessel, and the tunnel in which it works is liable to be choked, whenever the vessel moves from the canal into the sea in stormy weather.

"The stern paddle seems, therefore, the only means for adapting a canal steam boat, both for sea voyages and canal traffic."

Mr. Fairbairn disapproves, however, of the common mode of applying a single stern paddle contained in a sort of chamber, and proposes instead, two narrow paddles, one on each side the rudder, so as to allow a free access of water to the paddles, and a free outlet to the discharge of the wheels on both sides; to prevent the wheels getting damaged, he proposes a fender or portcullis, sliding down on the outside of the wheels to protect them from injury in the canals, to be drawn up when the vessel is at sea.

Mr. Fairbairn's experiments are valuable, inasmuch as they appear to have struck a blow at the prejudice against quick speeds on canals, and they may lead to a fair trial whether steam boats can or cannot be made to answer for canal conveyance.

We do not, however, think that his experiments bear very decidedly upon the question, of whether steam boats can be made to move rapidly in narrow canals, without injury to the banks; because all his trials of great speeds were made by towing light boats, which rise somewhat out of the water, when drawn at a great speed, and consequently become in effect boats of a less displacement. But steam boats which act upon the water, displace just as much water at 12 miles per hour as they do at 6.

The trials that Mr. Fairbairn made with paddles, were also with light boats of very small draught, and at moderate speeds.

We understand that Mr. Fairbairn's new twin boat, the Lord Dundas, has been completed since the publication of his volume, and was tried on the river Irwell, near Man-

chester. She drew 20 miles without cargo (except her machinery), and her average speed through the waters was about 7½ miles per hour. The surge was not great.

We perfectly agree with Mr. Fairbairn in his preference of stern paddles, and of his proposed plan of two narrow stern paddles for canal navigation. It must be remembered, however, that they are inferior in effect to side paddles, because they cannot get so free and full a supply of water. Hence that deficiency of effect must be made up by an increased power in the engines.

There are now in France steam boats plying on the Saône, with stern paddles; they are fitted with English engines, and are said to perform very well.

The plan of stern paddles was proposed, if we remember right, by Mr. Higginson, as a communication from America, and a patent granted for it in 1812, but it was not executed. It is said to have been executed in America, and to have answered very well.

Literary Notices.

A production of diligent research, and philosophical comparison, has just appeared, entitled "The Mythology of Ancient Greece and Italy," by Thomas Keightly, &c., and is a great desideratum in our literature which we have long wished to see filled up; it is a classic and scientific work, at the same time forming a popular compendium of an interesting subject.

Dr. Lardner has, in the 17th number of his "Cabinet Cyclopædia," just published, a Treatise on Hydrostatics,

and Pneumatics, which is a great and valuable addition to this meritorious compendium of modern science.

We perceive Dr. Paris's Life of Sir Humphrey Davy has deservedly reached a second edition.

In a few days will be published, the History of Medicine, Surgery, and Anatomy, from the earliest period to the present time, by Dr. Hamilton. It will include many curious biographical notices of eminent professors.

Mr. John Elmes has just published "A Topographical Dictionary of London and its environs." The object of this work is to describe London in the nineteenth century in a manner that may at once direct the inquirer to any square, street, building, &c. It is evidently the result of much labour, and is far more useful, because much more simple, than any directory can ever be. The whole is "got up" with astonishing care and accuracy.

The Society of Painters in Water Colours have recently opened their gallery to the public, containing perhaps the most beautiful productions, from the pencils of Copley Fielding, the Miss Sharpes, De Wint, Cattermole, Harding, Richter, and many other distinguished members of this Society, that have yet met the public eye. The exhibition is altogether the finest we ever remember to have seen in this gallery. The Society are about to publish "The Gallery of Painters in Water Colours," engraved by the first artists, and containing that selection from its subscribers which they consider to be the most happy productions of their pencil. This will certainly be a beautiful and interesting series of engravings.

Society of British Artists.—The eighth exhibition of this Society has lately been opened to the public; it consists of nine hundred and fifteen productions of art, in painting, drawing, sculpture, and engraving; and certainly affords ample proof that the greater proportion of its contributors are rapidly improving. Neither our time nor our limits will permit us to notice these works individually.

Cambridge and London University.—An attempt has been made in the University of Cambridge to get up a remonstrance against the grant of a charter to the London University. The remonstrance (called a grace) was carried in the caput, but was defeated by the junior masters of arts by a majority of seventeen to eight.

In the Press, and shortly will be published, Popular Lectures on Astronomy, with numerous Designs, illustrative of the subject, engraved in wood, as an Introduction and Compendium to the Use of Globes, in a Series of Problems. By William Newton. 12mo.

Scientific Miscellanies.

Action of Metals on Water and Carbonic Acid.—M. Despretz has stated to the French Academy, that nickel, cobalt, zinc, and tin, possess, like iron, the property of decomposing water at a red heat, and that their oxides are reduced by hydrogen at the same temperature: he has also observed that carbonic acid is converted by zinc and tin into oxide of carbon, and that this gas completely reduces the oxides of these metals. Thus a fact, which was considered as anomalous, extends to several metals and binary compounds.

Exeter Hall, the most striking of the architectural improvements in the Strand, has been recently opened; it consists of a spacious hall, 130 feet in length, by 76 in breadth, and capable of holding upwards of 2,500 persons, which is designed for the meetings of the larger societies, including the religious, charitable, and scientific institutions of the metropolis: a second sized room, 58 feet long and 31 feet 6 inches wide, for smaller meetings, and calculated to contain an audience of about 690; together with twenty-three other rooms, of different sizes, intended for committee rooms and offices, several of which are already occupied. The building is said

to have cost about 28,000*l.* nearly the whole of which sum has been raised by subscription of 50*l.* shares.

Dry Rot.—It has been found that the timber used about the copperas works in Whitstable, in Kent, has continued in a sound state for many years, which the seafaring people of that place attribute to its being soaked in the liquor that runs from the copperas stones, and are unanimous in thinking this would prove a complete preventive of dry rot. There is a greater reason to hope for a good effect from this, as the copperas liquor, by its sulphuric acid, has a decided action on every part of timber, somewhat analogous to that which charring has on its surface, by which it has been long known to be preserved where it otherwise would have decayed rapidly.

Application of Electro Magnetism to the Discovery of Metallic Veins.—In the second part of the Philosophical Transactions for 1830, is a paper by Mr. Robert Ware Fox, on the electro-magnetic properties of metalliferous veins in the mines of Cornwall.

Plates were connected by copper wire, 1-20th of an inch in diameter, including a galvanometer in the circuit, and extending in some cases as far as 300 fathoms. The action on the needle he found to vary generally with the quantity of ore and depth of the station. Hence from such experiments material assistance may be derived to the practical miner, in attempting to ascertain the amount of ore in particular veins, and the direction in which it is likely to occur in the greatest abundance.

Mineralogical Survey of Scotland.—It appears that the details connected with the mineralogical survey of Scotland, have been called for by the House of Commons. This was highly necessary, and we hope will be productive of some advantages to science.

Fossil Bones, found near Brighton.—The fossil remains of a large quadruped, supposed to belong to the genus mastodon, have been recently discovered about four miles from Brighton, a few feet below the surface. Among them are two teeth,

each weighing about eight pounds and a half. They are, we understand, in the possession of Richard Weekes, Esq. of Hurstperpoint.

Barometic Variations.—M. Bouvard, of the Observatory at Paris, has lately published very numerous and minute observations on the movements of the barometer, from which it would appear that, towards the equinoxes, this instrument attains its maximum at about eight or nine a. m., and at about eleven p. m.: the minimum at the same period is at four a. m. and at four p. m. In summer the maximum is at ten minutes past eight a. m. and in winter at thirty minutes past nine a. m.

Earthquakes.—The shock of an earthquake, it is stated in a Caernarvon journal, was felt at Bardsey island, on Thursday, the 17th of March. It lasted about a minute and a half. A similar phenomenon occurred about seventy years ago. This is the second earthquake on the British coasts within that month, Dover, Deal, Sandwich, and the adjacent parts of Kent, having been affected by a movement on the 2d.

French Industry.—The Académie de l'Industrie at Paris has offered a gold and silver medal (the former of the value of five hundred francs) for the best and second best "inquiry into the scientific and practical principles most favourable to the progress of agricultural, manufacturing, and commercial industry in France."

It is stated that the Esquimaux have not this season visited any of the Hudson's Bay settlements, and the fact cannot but be considered interesting with reference to Captain Ross's expedition. It is to be presumed, that had these people fallen in either with our enterprising countryman or the wreck of his vessel, they would waive their usual journey, having through these means procured their supplies; but at all events the probability is, that Captain R. had joined the main land, though up to last winter he had not been able to passit.

Mr. Macdonald, the successful sculptor of the north, has opened an exhibition in Pall Mall, evidently attempting rivalry

with our Chantreys and Westmacotts; but unequal as the attempt may be, it is nevertheless deserving. The exhibition consists of several colossal groups and numerous busts, of great beauty and richness.

Ink.—A plan has succeeded for preparing writing ink in cakes, to be ground down as occasion may require, like Indian ink. This discovery will be of great value to travellers in warm climates.

New Patents Sealed, 1831.

To Thomas Brunton, of Park Square, Regent's Park, in the county of Middlesex, Esq. in consequence of having had communicated to him by a certain foreigner residing abroad, an improvement in certain apparatus, rendering the same applicable to distilling.—Sealed 28th March, 6 months.

To Thomas Coleman, of Saint Alban's, in the county of Hertfordshire, training groom, for his having invented an improved roller for horses—29th March, 6 months.

To Andrew Ure, of Finsbury Circus, in the county of Middlesex, M. D. for his having invented an improved apparatus for distilling.—31st March, 6 months.

To John Wallace, of Leith, brazier, for his having invented an improvement or improvements upon the safety hearth for the use of vessels.—31st March, 6 months.

To James Slater, of Salford, in the county of Lancaster, bleacher, for his having invented or found out certain improvements in the method of generating steam or vapour applicable to a moving power, and to arts and manufac-

tures, and also for improvements in vessels or machinery employed for that purpose.—2d April, 6 months.

To William Rutherford, jun. of Jedburgh, in that part of the United Kingdom called Scotland, writer and bank agent, for his having invented a combination or arrangement of apparatus or mechanism to be used by itself, or applied to locks and other fastenings, for more effectually protecting property.—14th April, 6 months.

To Samuel Morand, of Manchester, in the county of Lancaster, merchant, for his having invented or found out an improved stretching machine.—14th April, 6 months.

To Thomas Brunton, of Park Square, Regent's Park, in the county of Middlesex, Esq. for a communication made to him by a certain foreigner residing abroad, of an improvement in certain apparatus, rendering the same applicable to steam engines.—14th April, 6 months.

To Thomas Brunton, of Park Square, Regent's Park, in the county of Middlesex, Esq. for a communication made to him by a certain foreigner residing abroad, for an improvement in certain apparatus, rendering the same applicable for making or refining sugar.—14th April, 6 months.

To Thomas Gaunt, of Chapman Street, Islington, in the county of Middlesex, gentleman, and George Frederick Eckstein, of Holborn, in the same county, stove and grate manufacturer, for their having found out and invented an improved fire grate.—14th April, 6 months.

CELESTIAL PHENOMENA, FOR MAY, 1831.

D.	H.	M.	S.	
1	0	0	0	☉ before the Clock 3 *m.*
2	9	0	0	☾ in conj. with *d* in Sagitt
4	15	35	0	☾ in □ last quarter
5	0	0	0	☉ before the Clock 3 *m.* 27 sec.
5	4	0	0	☾ in conj. with ♃ long. 20° in Cap. ☾ lat. 38' N. ♃; lat. 40' S. diff. lat. 1° 18'
6	14	0	0	☾ in conj. with λ in Aquarius
7	0	0	0	☾ in conj. with φ in Aquarius
9	17	0	0	☾ in conj. with ν in Pisces
10	0	0	0	☉ before the clock 3 min. 49 sec.
10	12	0	0	☾ in conj. with 2 ξ in Ceti
10	19	0	0	☽ in conj. with μ in Ceti
11	12	1	0	Eclip. conj. or ● new moon
12	9	0	0	☽ in conj. with γ in Taurus
12	10	0	0	☽ in conj. with 1 δ in Taurus
12	10	0	0	☽ in conj. with 2 δ in Taurus
12	15	0	0	☽ in conj. with α in Taurus
14	0	0	0	☿ Stationary
14	10	0	0	☽ in conj. with ν in Gemini
15	0	0	0	☉ before the Clock 3 min. 55 Sec.
15	7	0	0	♂ in conj. with ε in Gemini
18	0	0	0	♅ Stationary
18	4	12	0	☽ in □ first quarter
18	5	0	0	☽ in conj. with α in Leo
18	17	0	0	☽ in conj. with ρ in Leo
19	17	0	0	☽ in conj. with σ in Leo
20	0	0	0	☉ before the Clock 3 min. 48 Sec.
21	9	6	0	☉ enters Gemini
21	10	0	0	☽ in conj. with 1 γ in Virgo
22	19	0	0	♀ in conj. with ε in Gemini
25	0	0	0	☉ before the Clock 3 min. 28 sec.
25	4	0	0	☽ in conj. with γ in Libra
25	15	0	0	☾ in conj. with ψ in Libra
26	4	0	0	Ecliptic oppositton or ☉ full moon
26	8	0	0	☾ in conj. with φ in Oph
29	15	0	0	☾ in conj. with *d* in Sagitt
30	0	0	0	☉ before the clock 2 min. 55 sec.
31	4	0	0	♀ in conj. with ♂, long. 18° in Gemini ♀ lat. 2° 7' N. ♂ lat. 1° 18' N. diff. of lat. 49.

J. LEWTHWAITE.

The waxing moon ☽.—the waning moon ☾

METEOROLOGICAL JOURNAL, FOR MARCH AND APRIL, 1831.

1831.	Thermo. Hig.	Thermo. Low	Barometer. High.	Barometer. Low.	Rain in inches.	1831.	Thermo. Hig.	Thermo. Low	Barometer. Hig.	Barometer. Low.	Rain in inches.
MAR.						April					
26	55	35	29,63	29,35	,075	11	60	31	29,93	29,86	
27	59	39	29,93	29,83	,075	12	64	34	29,89	29,76	
28	61	30	29,99	29,94		13	65	42	29,76	29,75	,35
29	47	35	30,14	30,06		14	57	42	29,87	29,83	
30	48	33	30,22	30,16		15	60	34	29,90	stat.	
31	49	33	30,32	30,29		16	60	40	29,98	29,94	
APRIL											
1	49	32	30,30	30,19		17	56	29	29,94	29,92	
2	44	32	30,01	29,95	,15	18	57	27	29,98	29,92	
3	48	36	29,93	29,72		19	57	33	29,90	29,83	
4	55	32	29,68	29,53		20	58	34	29,79	29,68	
5	59	27	29,48	29,46		21	58	35	29,53	29,45	
6	58	32	29,55	stat.		22	63	39	29,44	29,43	
7	62	34	29,39	29,24		23	58	40	29,67	29,48	
8	50	42	29,32	29,24	,125	24	56	40	29,83	29,75	,175
9	57	40	29,48	29,41	,425	25	63	40	29,92	29,84	
10	56	43	29,76	29,52	,375						

Edmonton. *Charles Henry Adams.*

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XXXIX.

[SECOND SERIES.]

Original Communications.

IV.—On the Employment of Machinery.

To the Editor of the London Journal of Arts.

Sir,—I cannot presume, for a moment, to imagine, that the feeble efforts of my pen can produce conviction in the prejudiced mind, or shake the rooted opinions of the self-satisfied bigot, but the groundless assertions, of the injurious effects of machinery, which envy, or some worse spirit dictated, have been so ably and extensively promulgated by the enemies of improvement, that prompt and unwearying diligence is necessary to give them a decisive refutation. This will be best effected by keeping our subject under constant consideration, when practice and daily experience will force that conviction on the incredulous and partial, which words and arguments are at present inadequate to establish.

I have been much surprised to find the various accomplishments of scientific and inventive genius stigmatized in print as *Unnatural productions.* But such pitiful charges are the watch-word and cry of those only who ignorantly fancy that their selfish individual interests clash with the best interests of their country; or those whom jealousy of future reputation has prompted to envy the magnificent display and splendid operations of mechanical power.

It may be convenient for, and suit the purposes of a few, who love to excite and feed discontent, to substitute this mode of untenable assertion in the place of argument. Let us examine how far this idea of unnatural, as applied to machinery, is correct.

Invention is little required, and seldom called forth, in a nation where commerce is disregarded, or whilst yet in a state of infancy. Commerce never extends itself in any country where there is not an exuberance of unemployed capital. It is the offspring of wealth, nursed in the lap of internal power, and the early, but faithful, companion of refinement. As commerce rises, so wealth and capital increase. This increase creates greater and more extensive demands than human labour can execute. Mechanical knowledge and science, ever attendant on commercial prosperity, are called in to supply this deficiency; capital is more deeply invested; and productive power advances in proportion as wealth and refinement increase our artificial wants. Is there, then, any thing unnatural in the rise of commerce?—a convincing proof of internal prosperity. Is there any thing unnatural in that accumulation of serviceably employed capital, which induces mechanical improvements among an industrious and persevering people? Is there any thing unnatural in the demand for production increasing with wealth and productive power; or in the means of production (namely, machinery,) being increased to meet the demands upon it? Or, is there any thing unnatural in our investing capital in commerce, to reap, by the aid of machinery, an interest of from 15

to 20 per cent. when, otherwise, part of it must be idle and unproductive, or, at the most, realize from 5 to 7 per cent? It might be asserted, with equal truth, that it was unnatural for man to satisfy the cravings of hunger or the wants of nature; or that it is unnatural for him to prefer faring plentifully and sumptuously, when left with a choice to do so; or linger on, on the borders of bare necessity, nearly allied to starvation. Is it unnatural, let me further ask, for man to direct his aims towards the attainment of that gradual perfection, which human nature is supposed ever to advance to? or, for him assiduously to endeavour to supply those deficiencies in his artificial wants, which his munificent parent, nature, has considered it unworthy of her gracious dignity to gratify.

In reading a book, recently published, upon the injurious effects of machinery, I find a simile instituted, which I take the liberty of introducing here. It is appropriate. That part of the body politic styled the commercial interest, is compared to the human frame, and machinery is described as unnatural tumours and excrescences spreading over it. I shall avail myself of this simile, by carrying it a little farther, and describe our commerce as the human constitution, our currency as its circulating blood, and our machinery as its nerves, sinews, and veins. The only unnatural part follows. Having drained the once vigorous constitution of its life's blood, even to the last stage of faint exhaustion, and refusing all necessary restoratives, they expect the nerves, sinews, and veins, still to perform their respective operations, and carry on the works of nature with equal strength and rapidity as before, without the slightest appearance of even a temporary stagnation. Trifling in this manner with the constitution, I affirm to be unnatural; but I deny that the constitution itself, or its parts, are unnatural, merely because enfeebled, and labouring under the effects of lassitude. Of the expediency of employing machinery, some hesitate and doubt; but if asked whether it be expedient that the circulation, sinews, nerves, and veins, be allowed to perform their

respective offices in the human frame, to which we have assimilated commerce, they would ridicule the question as absurd, and avoid the querist as mad.

It is further advanced that machinery is a dangerous remedy, a last resort, only to be applied in extreme cases; such, for instance, as during our late war. But last resorts, efficient remedies, are not always at hand in any emergency, particularly if neglected in the leisure times of peace. How are we precisely to ascertain when the immediate necessity has ceased, and when the beneficial remedy may be safely dispensed with? Is there any thing wise or provident in neglecting our condition until the hour of danger? When this hour of danger has passed away, those who appear so anxious for the abolition of machinery, and recommend its instant suppression, forget to inform us how the amount of productive capital, thus hastily and wantonly to be destroyed, is to be repaid to the employer, or how its owner is to be indemnified for his loss. For it is ridiculous to suppose that any man, upon the inconsiderate suggestion, merely to meet the erroneously and partially supposed interests of a few, will sacrifice that property by which he acquires a livelihood, and by which a large part of the community gain their subsistence. The labourer flourishes solely upon the resources of his employer; and machinery, the resource of many employers, has communicated its benefits unsparingly to thousands. Considerably more than half the commercial capital of the country is vested in machinery; if this machinery be suppressed, an immense loss of capital ensues, and our resources must consequently be diminished; what, then, is to become of that surplus population for whom the inconsiderate demand hand labour? The hungry poor cannot work for nothing; and if their masters be deprived of their capital, they certainly can no longer furnish employment.

Over-production is the prevailing outcry of the present day. In the years 1822, 1823, 1824, and 1825, we heard nothing of this, although the amount of manufactured produce was much

greater than it now is; nor did we hear talk of surplus population, for all were advantageously employed. Since those periods our demand has decreased in more than equal proportion to that in which our productive powers have increased. Is not this sufficient cause for distress? The latent energies of the nation are gradually stagnating for want of sufficient means to stimulate exertion, and for want of sufficient latitude in which to exercise and display such exertion. The state of our productive powers, necessarily dormant and torpid, from the want of brisk markets, affect all classes of society, and depress all interests. The agriculturalist complains that the powers of his soil are retrograding and diminishing for want of sufficient means barely to sustain them, with nothing to spend upon their improvement. His expenditure is necessarily curtailed, and in that diminution the sales and profits of the manufacturer are most sensibly affected. Yet, under the universal voice of complaint, this morbid state of our commercial leprosy is left to remedy itself, solely by the strength of its own constitutional power. The old adage, of—Nature does her own works—seems to be closely acted upon; and the exhaustion of nature in this instance appears likely to produce its own work of *death,* unless speculation be promptly encouraged, machinery promoted and carefully protected, and vigorous remedies applied to quicken the action and increase the capabilities of our boasted *metallic* currency. I remain, Sir,

Your's, &c.

H. C. HARRIS.

Stroudwater, May, 1831.

Art. V.—Dr. Haycraft on the Employment of Surcharged Steam.

To the Editor of the London Journal of Arts.

Sir,—Having for many years pursued a series of enquiries on the mechanical properties of steam, especially of what is usually

called surcharged steam, *i. e.* of steam that has been subjected to a higher temperature than that at which it was generated, I beg to offer a few observations on this subject, which you will oblige me by inserting in your useful Journal of Arts and Sciences. Referring to the specification of my patent for improvements in steam engines (see Vol. VI. Second Series, p. 270) it will be seen, that, in the process of producing surcharged steam, the steam is increased in volume with a proportionate increase in its mechanical power; the process itself being effected at a comparatively small expenditure of fuel.

In pursuing these enquiries, I have found from the effects of surcharged steam in several experimental engines, that, when the cylinder is properly constructed, the power produced is far greater in proportion to the fuel employed, than that from ordinary steam. Encouraged by this success, a twelve-horse power engine has been erected, which, in its working, has proved the truth of my assumed principles in a most satisfactory manner.

It will be proper, however, before giving a detailed account of this engine, to endeavour to correct some errors which practical and even scientific men have fallen into concerning steam, when applied to produce power.

It is generally supposed, that if steam is heated beyond the temperature at which it is generated, its force is not increased, but, on the contrary, that it is diminished; that the super-temperature by some means or other, kills or destroys its elasticity. I will first shew how this mistake has arisen. The following experiment was made by Mr. Perkins, assisted by Mr. Penn, jun. at his steam engine manufactory at Greenwich, and similar experiments have been made by others. Surcharged steam was generated by passing small quantities of water through a system of cast iron tubes, heated to a high temperature. This surcharged steam was applied to Mr. Penn's high pressure engine of, I believe, six-horse power; after a short time, the engine lost its power, namely, as soon as the cylinder had

acquired a super-temperature, although there was abundance of steam. What could have been the cause of this? Most practical men would say, that the surcharged steam had lost its elasticity; and, therefore, its power to work the engine. Messrs. Penn and Perkins, however, discovered the fault, and endeavoured to remove it.

The fault was, that as soon as the cylinder became considerably heated, the packings of the piston and piston rod could no longer confine the steam; and it appeared on examination, that these packings had become completely dried, and therefore easily permeable by steam; and that, consequently, its force could not be exerted on the piston. To remedy this, the surcharged steam was first passed over the surface of water contained in a second boiler, by which process it rapidly absorbed water until it was saturated, when the engine worked perfectly well. It will, however, be perceived, that in this case, the surcharged steam, by imbibing an additional dose of water, was converted into ordinary steam, which is disposed when introduced into a working cylinder, to deposit a portion of its water, because the cylinder is of a lower temperature than the boiler. This water, by moistening the packings, renders them, to a certain degree at least, steam tight.

The same fact has been observed in condensing engines, when from accident—namely, from the boiler being almost empty, and the fire being urged, so that the upper part of the boiler was extremely heated, and the steam thereby surcharged. In this case, although there is abundance of steam of the usual pressure, the engine will not do its work.

I had an excellent opportunity of observing this *apparent* want of power in surcharged steam in an experimental condensing engine. In this engine, the steam was surcharged by means of high pressure steam surrounding the cylinder. The piston was provided with metallic plates, which acted well, even with surcharged steam. The piston rod had the usual hemp packing. The engine worked well for some time, till the piston rod had become considerably heated and its packing dried, when, all at

once, a rushing of air was heard through the packing, and quantities of air were pumped up by the air-pump, and the engine lost its power. The power could be restored by moistening the packing, or by pouring in quantities of oil, which latter, however, passed through with great rapidity.

From the foregoing observations it will appear, that the *apparent* want of power in surcharged steam, is to be attributed to the great difficulty of keeping the joints and packings tight, arising from the disposition which surcharged steam has of drying and injuring the packings.

The experiments, from which some years ago I directly proved the *increased* power of surcharged steam, are very simple. They consisted in accurately weighing a copper ball, containing steam of the boiling temperature; then, by immersing the ball in heated oil, its temp. was raised to 312°, allowing the surplus steam to escape by a small orifice, which was subsequently closed very accurately; then by subtracting the weight of the empty ball from the two weights, it appeared that steam surcharged to 100° above the boiling point, weighs one-tenth of ordinary steam, it being still able to bear the atmospherical pressure. Thus one volume is converted into ten volumes, each of which, if its temperature be preserved, will produce a mechanical power equal to the original volume, that is, we increase the whole power ten-fold.

Then the question became, how can we confine this surcharged steam, so as to make it available to produce power?

It has been already seen, that it is from its disposition to dry the packings, that the steam so freely escapes in waste. After a number of experiments with different fluids, my brother and myself found that water alone, when interposed between the surcharged steam and the piston, was capable of effecting our object.

It is well known that water passes through compact, organized porous bodies with great difficulty. This is shewn in the hydraulic press, in which water, under a pressure of several thousand pounds on the square inch, is kept tight by a simple

ring of leather. To be assured of the applicability of this to the steam engine, a model was constructed, which was so arranged that water could be introduced between the piston and the working steam, or not, at pleasure. When the water was not interposed, there was a waste of steam which was not surcharged through the packing, at a pressure of 30lb.; but when water was interposed, the engine worked perfectly tight at a pressure of above 600lb. on the square inch.

Thus we have arrived at two important facts: first, that steam is capable by receiving a super-temperature, of increasing its power in a ratio equal to its increase of volume; and, secondly, that by the intervention of water between the steam and the packing, we are able to make a perfect joint completely impermeable by steam. It would be evident, however, that if water were interposed directly between the surcharged steam and the piston, it would be soon dried away, and our intentions would be defeated. For the purpose of obviating this, the arrangements, as described in the specification of my patent have been made, and the truth of the principles laid down completely put to the test.

In an experimental engine which I have constructed, the effect of the surcharged steam is very extraordinary. When it is used, the engine does not require one-tenth of the steam; and what is singular is, that the power of the engine is sensibly improved thereby. In this engine, the boiler is not sufficiently large to supply steam at 30lb. on the inch; but the moment the steam is surcharged, the steam pressure rises in the boiler till it arrives at 200lb., the engine going with its full power the whole of the time; after this, the escape by the safety valve is evidently greater than the quantity consumed by the engine. The surcharged steam, after escaping from the engine, is perfectly invisible, so that no appearance of steam can be observed at any time. This proves the extreme rarity of the surcharged steam. In the twelve-horse power engine that has been erected, I have not attempted to surcharge the steam to

so high a degree, for reasons that shall be given; yet the action is equally satisfactory.

There is another point very important to practical engineers, which seems to have escaped the notice of writers on the subject, and was equally unknown to the celebrated Watt; namely, the production of cold *within* the cylinder, occasioned by the evaporation of the water deposited on its internal surface. This evaporation takes place every time the vacuum is formed; it of course occasions a production of cold, which, in its turn, causes a fresh deposition of water and waste of steam. Thus every action of the engine causes a fresh condensation of, and waste of the first power.

Although Mr. Watt does not appear to have been aware of these series of actions taking place, yet he was perfectly sensible of the utility of preserving the temperature of the cylinder. For this purpose, he used to surround it with steam from the boiler, thinking it to be sufficient to prevent condensation, that the cylinder should be kept at the same temperature as the steam. Had he been aware of the cooling process described, he would probably have perceived, that to prevent the evil, it would be necessary to surround the cylinder with steam of a *higher* temperature than that of the working steam; in which case no condensation would take place with the consequent evaporation, cooling of the cylinder, &c.

In doing this, however, a practical difficulty presents itself; for if this is attempted in ordinary engines, the water is no longer deposited; and as I have before shewn, the packings become dry, and no longer steam tight. The intelligent reader, on examining the principles of the surcharged engine, will perceive, that this drying of the packings cannot take place, although the surcharged end of the cylinder should be raised to ever so high a temperature: the presence of water on the other side of the piston will always effectually preserve them from drying, or other injury.

(To be continued.)

Recent Patents.

To James Down, *of Leicester, in the county of Leicester, surgeon, for his having invented certain improvements in making gas for illumination, and in the apparatus for the same.*—[Sealed 5th August, 1830.]

This invention consists, first, in making or generating gas for the purposes of illumination, out of certain portions of the residuum, which in the ordinary mode of conducting the process is not available for those purposes—by passing crude or nascent gas, with its vapour of tar and ammonia, through a long stratum of ignited charcoal or coke, and thereby evolving an additional quantity of gas from the impurities of the said nascent gas; and secondly, in an improved box or vessel, contrived to contain a *long* stratum of charcoal or coke, in a state of ignition, in a *small* compass.

The impure gases produced by the usual modes of distillation from pit coal, or any other substance from which gas can be procured in the ordinary way, is to be passed through an extended stratum of ignited charcoal or coke, by means of the improved apparatus: which consists of a box or vessel of iron, or such other substance as will withstand the action of heat, the box being furnished with divisions, and nearly filled with charcoal or coke.

This box or vessel may be connected with the ordinary retorts, and by this means the necessary purity will be obtained by the very process of generating it from the impurities of the nascent gas without any special apparatus for that purpose.

Plate IV. fig. 2, represents a front elevation of two iron retorts, set in brick-work, with the improved apparatus connected thereto; *a*, is the door of furnace; *b, b,* the mouths of the retorts closed in the usual way; *c, c,* pipes for conducting the crude gas, leading from the retorts to the improved apparatus, shewn at A.

Fig. 3, letter A, is a longitudinal representation of the apparatus. Fig. 4, is a section of the same, also taken longitudinally. Fig. 5, is a top view, and fig. 6, a front view.

The improved box or vessel shewn in these figures is constructed of iron, and of a rectangular form *d, d, d, d,* about six feet long, two deep, and nine inches wide. Its interior is divided into several compartments by means of a series of iron plates or partitions, *e, e, e, e, e, e,* descending from the top to within a short distance of the bottom, and another series of iron plates *f, f, f, f, f, f,* intervening, rising from the bottom to within a few inches of the top, by which an extended passage is formed from end to end of the box or vessel. Into these compartments the charcoal or coke is introduced, filling the box or vessel nearly to the top; and when the charcoal or coke is brought to a state of ignition by means of the fire in the furnace and flue beneath the box or vessel, the gas in its crude state is allowed to proceed from the retorts by the pipes *c, c,* and passes through the ignited charcoal or coke in the direction of the said passage: when a decomposition of the tar and ammonia takes place, and an additional quantity of inflammable gas is evolved therefrom in a pure state, that is fit for use; while the length and shape of the passage in the improved box insures the perfect exposure of every portion of the crude or nascent gas to the action of the ignited material therein contained.

In the common mode of making gas fit for illumination, as generally practised, the gas is passed through a variety of processes and apparatus to effect the different progressive degrees of purification required, while the residuum, containing much good gas, is not converted into that material. In this improved mode of making or generating gas for illumination, the gas in its crude and nascent state, with the tar and its vapour, the ammoniacal liquor and its vapour, and also the sulphureous gas, is passed at once into the said box or vessel, constructed and filled as aforesaid, and thereby sufficiently purified, while it is evident that the external shape, general form, and dimensions of the box or vessel may be arranged and adapted to its situation, so as best to suit the circumstances of the particular establishment where the gas is to be generated and used.

The before described improved box, vessel, or apparatus, with

its passages, must be filled as before stated, with charcoal or coke, and heated to a degree of temperature sufficient to cause the enclosed charcoal or coke to be in a constant state of ignition; the heat necessary to be applied to this box, vessel, or apparatus, must be limited to that of a good gas making heat, for if it should be urged to a higher temperature than this, it will be injurious to the box or vessel, and at the same time detrimental to the illuminating power of the gas.

The heating of this improved box, vessel, or apparatus may be accomplished by setting it in the same furnace or bed with the retorts, and connecting two or more retorts with it, as shewn in the front elevation at fig. 2; or the like effect may be produced by embedding it in a distinct and separate furnace, but the method before described is preferred. It is only necessary further to state, that when it is required to remove the charcoal or coke from the above described improved box or vessel, for the purpose of replacing fresh materials therein, it may be done by displacing the mouth-piece or top parts of the box or vessel; and it will be obvious that whatever sized box may be resorted to, it must be so contrived and placed, that its contents may be capable of being removed at the pleasure of the operator.

The Patentee says, "I claim as my invention, first, making or generating gas, for the purposes of illumination, by passing crude or nascent gas through a long stratum of ignited charcoal or coke, whereby I evolve an additional quantity of gas from certain portions of the residuum, which, in the modes hitherto adopted, are useless for those purposes; and whereby I do away with the necessity of a separate purifying apparatus. And, secondly, the improved box or vessel, contrived to obtain that object, by means of the extended stratum of charcoal or coke, hereinbefore described."—[*Inrolled in the Rolls Chapel Office, 5th February,* 1831.

Specification drawn by Mr. Newton.

To THOMAS BULKELEY *of Richmond in the county of Surry, doctor of physic, for his invention of a method of making or manufacturing candles.*—[Sealed 26th January, 1830.]

THESE improvements in making candles consist in three particulars:—first, in making wax candles in moulds instead of forming them by rolling the wax, which is stated to be the ordinary way of producing wax candles; secondly, in making a case of wax shaped like a candle, which is to be afterwards filled with tallow or oil, or other combustible material suitable for making candles; and, thirdly, in forming and adapting a sliding wick for a candle, which shall descend as the candle becomes consumed, and never require snuffing.

The first object requires but little further explanation. To cast wax candle in moulds, it is obvious, that the wax must be poured into the moulds in a hot and liquid state, and when perfectly cold, the end of the candle is to be struck with a small wooden mallet for the purpose of disengaging it from adhesion to the surface of that mould, when it may be withdrawn. The Patentee has not said in what particular these mould-cast wax candles will be superior or preferable to those made by rolling the wax in the ordinary way.

In putting the second feature of the invention into operation, it is proposed to pour into the candle moulds the melted wax, as in the previously described process of moulding; and on the wax having cooled and become partially set or hardened, which it will do round the internal surfaces of the moulds before the wax in the central part of the candle has become set, then pour out of the mould the liquid portion of the wax which filled the central part of the candle, and allow the shell of wax thus formed on the surface of the mould to become hard. This shell may then be made the mould in which melted tallow,

or cocoa nut, or other oil may be poured, and a wick introduced for the purpose of making a candle resemble externally a wax candle; and as the wax will not melt at the same temperature as tallow, the candle will not be subject to guttering down, but the tallow or oil will always burn below the surface of the outer case of wax, which will gradually melt down by the heat of the flame, and have the same transparent appearance as a wax candle.

Lastly, the improved wicks, which are to be adapted to candles, are to be formed by extending a thin string of flax through the candle, and placing upon this string at the upper end a small tube of straw or paper, which tube will be sufficient to collect the fluid, tallow, or other material by capillary attraction, and so to form a wick or receptacle for the combustion of the tallow, and its conversion into the gas that supports the flame of the candle; and as the tallow becomes consumed, the wick will gradually descend, guided by the string still constituting the wick, while the string will moulder away as the candle becomes consumed, and not require snuffing.—[*Inrolled in the Inrolment Office, July*, 1828.]

To WILLIAM WESTLEY RICHARDS, *of Birmingham, in the county of Warwick, gun maker, for his having invented or discovered certain improvements in the touch holes of guns, pistols, and all sorts of fire arms fired upon the percussion principle.*—[Sealed 11th February, 1831.]

THIS invention consists in the adaptation of a newly contrived shield or cover to the touch hole, and a pin or plug containing the priming charge fitted to the said shield. The disadvantages of the copper cap commonly employed are well known. When

copper caps are used, the pieces of the cap in bursting are often projected away from the nipple, with considerable force, to the injury of the face, eyes, and hands of the sportsman, and from the quantity of percussion powder contained in them, the flash and report are much greater than necessary. In this contrivance the improved shielded touch hole and primer are so constructed as to obviate these defects, and to enable a smaller quantity of percussion powder to discharge the piece. The shielded or covered touch hole is so constructed, that the fuze or smoke arising from the explosion of the percussion powder and charge, is allowed to escape through an aperture or apertures made in the side of the shield near the touch hole, and away from the person firing the gun. The primers are made larger than the copper cap commonly used, and are more easily affixed to the gun in cold weather, when the fingers of the sportsman are benumbed with cold; consequently are not so liable to be dropped or lost, and are capable of being re-charged with percussion powder as often as required.

The following is the method of making the shield and primer: Take a piece of steel or other metal, about five eighths of an inch long, and three eighths in diameter; on one end cut a screw sufficiently long to secure it in the breech of the barrel, through which screw the touch hole is to be pierced to communicate with the charge; then drill down at the other end about three eighths of an inch deep, and one eighth of an inch in diameter, more or less, so as to admit of and hold the primer; then make an aperture or apertures at the side of the shield near the touch hole, for the purposes before mentioned. The primer consists of a metal pin or plug, of a suitable size for the interior of the shield, and in one end of it is a recess for the reception, or affixing of the percussion powder, and near the other end a spring or springs is attached for securing the primer in its place; and on the end last mentioned it is intended for the hammer to strike when the piece is to be discharged.

Plate V. fig. 1, shews the touch hole, shield and primer, attached to a gun. Fig. 2, is the same touch hole shield and

primer, detached from the gun, drawn of the real size. Fig. 3, is a side view of the same. Fig. 4, is the pin, plug, or primer removed out of the touch hole and shield. Fig. 5, is a section of the touch hole and shield, and fig. 6, is a section of the primer; the letters referring to similar parts in all these figures; *a*, is the screwed part of the shielded touch hole, which secures it in the breech of the gun; *b*, is the touch hole; *c*, the shield; *d*, the aperture for the escape of the smoke; *f*, the primer, with its recess, *g*, to contain the priming; *h*, *h*, are suitable springs attached to the primer, which embrace the outer edge of the shield when the primer is pushed into the touch hole, and by these springs the primer is securely held in its place.

The Patentee says, in conclusion, "In describing my method of making my improved shielded touch hole and primer, I do not confine myself to the dimensions stated, or the particular mode of securing the primers in the shield, or the affixing of the percussion powder on or in the primer. What I claim as novel and useful in my invention or improvement is, firstly, the constructing of touch holes for fire arms fired on the percussion principle, as before described, with the shield and its aperture or apertures; and secondly, the detached primers suitable for such shielded touch hole, as before explained."—[*Inrolled in the Rolls Chapel Office, April,* 1831.

Specification drawn by Mr. Newton.

To William Payne, *of New Bond-street, in the parish of St. George, Hanover-square, and county of Middlesex, watch and clock maker, for his invention of an improved pedometer for the waistcoat pocket, upon a new and very simple construction.*—[Sealed 15th Feb. 1831.]

This ingenious instrument is constructed in the form of a small flat watch, to be used in the waistcoat pocket, or

suspended round the neck, having an internal vibrating lever or pendulum, which is put in action by the motions of the body of the wearer in walking, or riding. The vibrating action of this lever is communicated by ratchet wheels and palls, through a train of toothed wheels and pinions, or by an endless screw and toothed wheels to the arbor or axis, which carries the hand or index that moves round upon the face of a graduated dial, to register the number of miles travelled.

As the motions of the body in walking, and riding on horseback, are different to that when riding in a carriage, the instrument is so constructed as to be applicable to either. The motion of the body in walking, and riding on horseback being an up and down motion, from the springing of the foot from the ground in walking, or the springing of the body from the saddle in riding, the vibrating lever must, therefore, for these adaptations, be placed horizontally in the pedometer, but as the motion of the body, when riding in a carriage, is at right angles to the former, or an osscillating motion, the vibrating lever must, for this adaptation, be placed in a perpendicular or pendant position, in order that the desired effect may be attained.

Plate V. figs. 7, 8, 9, and 10, are representations of the parts of the pedometer, as arranged and constructed for walking or for riding on horseback. Fig. 11, is a similar representation of a pedometer, constructed for riding in a carriage. Figs. 12 and 13, are representations of a pedometer upon the same principles as the former, but constructed to register a much greater number of miles. Fig. 7, is a representation of the face of a pedometer complete, with the dial plate graduated to register ten miles. Fig. 8, is a view of the interior of the

same, the dial plate being removed. Fig. 9, is a back view of the same, as seen when taken out of its case.

Fig. 10, is a view of the vibrating lever, detached with its palls and ratchet wheels. The respective letters of reference, pointing out similar parts in all the figures; *a, a,* is the vibrating lever having the weight *b,* attached near its end. This lever is affixed by screws to the smaller ratchet wheel *c,* in the centre of which is the arbor or axis that the lever hangs upon; and the axis also carries the larger ratchet wheel *d,* that turns freely upon it; *e,* is the spring which keeps up the lever when in a quiescent state, against the banking or adjusting screw *f.* When, by the stepping or springing action of the wearer, in walking or riding, the leaver is put in motion, the weighted end of the lever descends, but is instantly thrown back by the spring into its former position. On the underside of this second ratchet wheel *d,* is the small pinion *g,* (see fig. 8), which takes into the toothed wheel *h,* and through the train of wheels and pinions marked *i, j, k,* and *l,* communicates its motion to the hand or index upon the axis of the wheel *l,* which moves round the dial plate. Hence it will be perceived that every descent of the weighted end of the vibrating lever, will cause the larger ratchet wheel *d,* to be driven round one or more teeth, which will be prevented from returning by the pall (see fig. 9), and consequently remains in a quiescent state, while the spring throws up the lever to its former situation. It must, however, be observed that in this construction of pedometer, the vibrating lever would not act, unless placed nearly in the horizontal position shewn, which position is retained when the instrument is worn, by suspending it in the waistcoat pocket, by a small hook attached to the pendant, and passed over the band or edge of the pocket.

Having described the action of the improved pedometer for walking or riding on horseback, a different construction and adaptation of the same principle is shewn in fig. 11. In this figure, the interior of an instrument is exhibited, in which the vibrating lever hangs perpendicularly, and oscillated as a pendulum. This construction is designed to register the number of miles travelled over by a person riding in a carriage. The oscillatory motion of the body of the wearer will set the pendulum or lever vibrating, and actuate the train of wheels and pinions as before described: only in this instrument there is no spring required to bring the pendulum back into its position against the banking, as it moves by its own gravitation.

Figs. 12 and 13, are representations of a pedometer capable of registering a much greater number of miles by the addition of the pinion *o*, and toothed wheel *p*, upon the arbor or axis of which is affixed the auxiliary index *q*, registering on the smaller circle of tens of miles the number of revolutions of the ten mile wheel.

In order to register the distance travelled by any person correctly, it will be necessary to allow for any violent exertion of the body, as jumping or running, and the increased length of the strides of the wearer. In fig. 14, the pendulum is shewn with an elastic banking or adjustment, by the spring *r*, pressing on the end of the banking pin *s*, which will give way to the increased action of the vibrating lever, and allow it to move the ratchet wheel *d*, round through a larger arc, that is, to escape a greater number of teeth. In this figure is also shewn the coiled spring *t, t*, employed instead of the spring maked *e*, (fig. 9.) This coiled spring is attached at one extremity to the vibrating lever, and at the other it is fixed to the

stationary piece *z*, and is for the purpose of bringing up the lever to its quiescent situation against the banking.

The Patentee considers it necessary here to state, that "as the progress of the ratchet wheel *d*, and the train and index connected to it, will depend upon the length of the arc through which the vibrating lever moves, the banking is made capable of adjustment by means of the screw *f*, so as to regulate the extent of the vibrating action of the lever. It must be obvious that the motion of the vibrating lever may be communicated to the train of wheels and pinions, by other contrivances than the palls and ratchet above described. He does not, therefore, confine himself to that particular mode of communicating the action of the lever to the hand or index.

Lastly, the mechanism of the improved pedometer may be applied to a common watch, by placing the working parts of the instrument under the dial plate of the watch, and having a small circle on the dial with an index, to register the number of miles travelled."—[*Inrolled in the Rolls Chapel Office, April,* 1831.]

Specification drawn by Mr. Newton.

To Robert Stein, *of Regent-street, Oxford-street, in the county of Middlesex, gentleman, for his invention of an improvement in applying heat to the purposes of distillation.*—[Sealed 13th Dec. 1827.]

The object of the Patentee appears to be to economise fuel in the process of distillation, and for this purpose he proposes to connect a series of stills, and to conduct the heated vapour evolved from one still into or under the next still in the connected range, for the purpose of heating the wash contained in the second still, and causing it

to throw off its spirituous vapour, which in like manner is to be conducted to a third still, for the purpose of heating it, and so on.

No precise construction of apparatus is claimed, but it is proposed as eligible to attach a sort of jacket or casing to the lower part of each of the connected stills, and to carry a pipe from the head of one still to the under part of the next, through which pipe the vapour passes, and coming in contact with the bottom of the wash vessel of the next still, heats the liquor therein sufficiently to drive off its spirituous vapour, as in the ordinary process of distillation, which vapour is carried forward from the head by a pipe, to the under part of the succeeding still, and so on to the last still of the range, from whence the vapour there evolved passes to the worm tub; and the vapours which have thus operated, and have given off their caloric, and become condensed into liquids in the vessels under the several stills, are drawn off from those vessels for rectification.

The Patentee does not confine himself to the above described apparatus, but sometimes carries the vapour by a pipe, from the head of the first still, down into the wash of the next still, where it communicates its caloric to the wash, and so prevents the useless dissipation of the heat.

The stills being arranged and connected in any convenient way, are to be furnished with all the necessary pipes and cocks for conducting the wash, and for drawing off the product; but these form no part of the invention, which the Patentee says, "consists in applying some portions of the heat used for distillation over and over again."—[*Inrolled in the Inrolment Office, June,* 1828.]

To William Harland, M. D. *of Scarborough, in the county of York, for his having invented certain improvements in apparatus or machinery for propelling locomotive carriages, which improvements are also applicable to other useful purposes.*—[Sealed 21st December, 1827.]

This invention is said to consist in a peculiarly constructed boiler or steam generator; and in a mode of communicating the working power of a steam engine to the hinder wheels of a locomotive carriage.

The boiler or generator is made cylindrical, with two smaller internal cylinders, placed the one within the other, which with the cross connecting plates divide the boiler into chambers, for the fire place, the flues, and the water vessels, the latter of which are small, compared to the general dimension of the boiler, and therefore hold but a small quantity of water, and expose a great surface to the action of the fire and heated vapours which pass through the flues.

The form and construction of this boiler is said to be shewn by several rough outline figures appended to the Specification, but we do not discover any features of novelty between this and other high pressure boilers, which usually have an internal furnace, with contorted flues passing through; neither do we perceive the advantage of the small water chambers.

The second feature of this invention is a contrivance, by which the toothed wheels and pinions connecting the moving parts of the engine with the hinder running wheels of the carriage, are kept in gear, though the engine and its appendages are mounted on springs.

This is not very clearly shewn in the figures, but appears to be intended to be effected by placing the pivots

of the crank shaft of the engine in bearings which slide up and down in standards affixed to the carriage, by which contrivance the spur wheels on the crank shaft are kept always in connection with the toothed rims on the naves of the running wheels, although the engine and its appendages are in a state of vibration, from the carriage passing over inequalities on the surface of an ordinary road; the carriage being a phæton, or open body on four wheels.

The other parts of the contrivance are nearly the same as are usually adopted for the purpose of steering, and of palling the wheels of the carriage in going down hill; there are also proposed to be adopted dampers in some parts of the flues, for the purpose of varying the intensity of the fire, and regulating the steam; but this part of the contrivance we do not understand, and therefore cannot explain it.—[*Inrolled in the Inrolment Office, June,* 1828.]

To John Pearce, *of Tavistock, in the county of Devon, ironmonger, for his having invented an improved method of making and constructing wheels, and in the application thereof to carriages.*—[Sealed 5th August, 1830.]

The invention specified under this Patent, which the Patentee calls *an improvement in the method of making and constructing wheels,* appears to consist wholly in forming the box or nave of such metallic wheels as are constructed upon the principle of the patent granted to Mr. Theodore Jones, in October, 1826, (see the first vol. of our Second Series, page 154,) of wood and iron together, instead of iron only, as described in the former Specification; the box of the wheel has a metal socket,

as in wheels of the common construction, and has also two rings of iron, one on each extremity, to which the iron rods constituting the spokes of the wheel are attached, in the same way as in Jones's patent, and of which, in our opinion, it is much too close an imitation to be maintainable. There is some little difference in the formation of the axletree, which is made only about the width of the carriage, and has its ends formed into hollow cylinders, into which steel or iron ends are to be fixed for the wheel to turn upon; but what advantages are to be derived from this difference, the Patentee does not point out.—[*Inrolled in the Inrolment Office, February,* 1831.]

To JOHN HARVEY SADLER, *of Hoxton, in the county of Middlesex, machinist, for his invention of certain improvements in power looms, for the weaving of silk, cotton, linen, wool, flax, and hemp, and all mixtures thereof.*—[Sealed 12th December, 1827.]

THE Patentee states, that in the construction and arrangement of the operative parts of a loom, he does not propose to make any improvements, but that his invention consists in the method or mechanism by which the several parts are actuated. A loom, therefore, for weaving any of the fabrics above named, is to be constructed in the ordinary way, as far as respects the disposition of the batten and reed, the headles, and the mode of driving the shuttle across the warp, and the power for driving it is to be applied by means of a band and pulley to a transverse shaft placed above the loom.

Upon this main shaft are fixed certain cams and other appendages, which, as the shaft revolves, act upon certain levers and rods, and give the desired movements by which the batten and reed are made to vibrate, and the headles with the sheds of warp are raised and depressed, the shuttle is projected to and fro,

and the cloth, when woven, is progressively drawn forward, and rolled upon the cloth beam.

The specification of this invention is of an immense length, and the drawings, though exceedingly rough, are numerous; we are therefore constrained, in the present instance, to limit our report to merely a general description of the contrivance, but which we hope will give a tolerable idea of the Patentee's intentions.

The main shaft which carries the cams for driving the several parts of the loom, is mounted in bearings fixed upon the top of the frame-work, and extends beyond the breadth of the loom; it is driven by a pulley and band, leading from the rotatory part of the steam engine, or other power; and in order to put the loom in action or stop it, a clutch box is placed upon the main shaft, which may be slidden to and fro, for the purpose of locking the shaft to the rotatory pulley, or disengage it therefrom.

This clutch box is shifted by means of a pendulous lever, to be moved by the hands of the attendant when required. The lever hangs in a perpendicular direction at the time that the clutch box is withdrawn from the rotatory pulley, at which time the machine is quiescent; but when the lever is lifted up, the clutch box locks the pulley and the shaft together, and the machinery is put in action.

The batten with the reed vibrates freely, hanging upon centres, and is not actuated by rods or levers, as in other power looms. A small cam, upon the middle of the main shaft, acts against a bent lever, to the end of which a cord is attached, for the purpose of drawing back the batten, and when the end of the snail cam has passed the point of the bent lever, the batten is allowed to fall for the purpose of beating up the weft. The force of the batten may be increased by weighting it, or for light fabrics, the blow may be partially counteracted by springs; and in order to give steadiness to the batten as it swings, it is connected at the under part to the frame work by jointed levers.

For the purpose of driving the pecker lever, which projects the shuttle to and fro, oblique spring cams are fixed upon the main

shaft above, which occasionally come in contact with a friction roller at the upper extremity of the pecker lever; as the shaft goes round, these spring cams alternately act against the pecker lever, and at the proper times give it the swift movement, which causes it to project the shuttle along its race between the sheds of warp.

In other looms the peckers which drive the shuttle are thrown back into their boxes by the returning stroke of the shuttle, which renders it necessary to exert such a force in projecting the shuttle, as frequently causes it to jump out of its race. In this improved loom that inconvenience is superseded by connecting the two peckers together by a cord passed under the shuttle race, so that in driving one pecker forward the other is withdrawn, and the momentum of the shuttle projected with a small force, is enough to carry it into its box, which it reaches without the labour of driving the pecker before it.

In order to stop the loom, in the event of the shuttle not arriving at its destination, a friction pulley is placed at the back of each shuttle box, round which pulley a cord is passed connected to a lever. When the shuttle in returning passes this pulley, the friction in passing turns the pulley round, and the cord draws the lever into such a situation as will allow of the batten and reed beating up the weft; but in the event of the shuttle stopping between the sheds of the warp, the pulley in the box is not acted upon, and the lever being consequently left standing, obstructs the descent of the batten, and at the same time lets down the pendulous lever, which throws the clutch out of gear, and stops the machine.

For the purpose of rolling up the cloth as it becomes woven, an endless screw upon the main shaft drives a toothed wheel upon the end of a small verticle shaft, which carries a wooden roller, and this roller acting by friction, slowly turns the work beam, and winds on the cloth. This friction roller is capable of adjustment to regulate its speed according to the quality of material to be woven, and as it acts by friction alone, is capable of sliding when any undue strain comes upon it.

In adopting this contrivance to a power loom for weaving tapes and ribbons, it is proposed that the driving apparatus should be placed below, but for reasons above given we are unable to enter into further details.—[*Inrolled in the Inrolment Office, June,* 1828.]

To JOHN BENJAMIN MACNEIL, *of Foleshill, Coventry, in the county of Warwick, engineer, for his invention of certain improvements in preparing and applying materials for the making, constructing, or rendering more durable, roads and other ways, which materials so proposed are applicable to other purposes.*—[Sealed 6th May, 1828.]

IT is considered, by the Patentee, that the principal cause of roads becoming decayed or rotten, as it is commonly termed, arises from the rain, and other waters soaking through the superstructure of gravel or broken stones, and softening the clay or other soil that constitute the foundation, which, by that means, becomes soft, and oozes up to the surface, rendering the road muddy and unsound.

To obviate this defect in the construction of roads, is the design of the present invention, which consists in preparing a firm and compact foundation of terrace or artificial stone, which shall be impervious to water, and, by that means, prevent the soil below becoming softened, or the surface sinking.

The composition which is to form the bed of the road is proposed to be made of one-eighth part clean sand—one-eighth Roman cement, compounded of the usual and known materials, and the remaining six-eighths of small gravel, broken flints, or granite, or other stone, reduced to small pieces, which are to be mixed with about one-fourth their bulk of water.

These materials, when properly combined, are to be poured into moulds of suitable shapes, so as to cast the composition

into blocks, which blocks, when they have become hard, are to be employed as pavings for the foundation of the road previous to depositing the gravel or broken stones intended to form its surface.

The blocks are to be cubes, or other rectangular figures, on their sides and bottom surfaces; but their upper surfaces are to be bevelled, that is, their edges cut off slanting, so that when a series of these blocks are combined for forming the foundation of the road, there may be long grooves extending across the foundation of the road, for the purpose of forming drains to carry off the water that may have percolated through the superstructure of gravel or broken stones, and thereby prevent the soil of the foundation being disturbed, which will consequently prevent the road from becoming softened, and preserve it from decay.—[*Inrolled in the Inrolment Office, November*, 1828.]

To JAMES HALL, Jun. *of Ordsall, near Manchester, in the county of Lancaster, dyer, for his invention of certain improvements in dying piece goods by machinery.*—[Sealed 2d January, 1828.]

THE machinery which constitutes the subject of this invention consists of a vat, containing the dyeing liquor, which has a series of guide rollers mounted within it, and a web or apron intended to conduct the length of piece goods about to be dyed through the liquor in the vat, for the purpose of exposing the surface of the goods to a regular and equal action of the dye-liquor.

A section of this vat, with the rollers within, is shewn in Plate IV. fig. 7, which also exhibits the mode of driving the rollers and the web or apron which conducts the piece goods through the dye, the rollers by which the goods are squeezed for expressing the dye-liquor when the dyeing is done, and the

roller from whence the length of piece goods is to be drawn when first introduced into the vat, or on to which it is wound when withdrawn.

The vat is of a rectangular form, shewn in section at *a, a, a,* in which the cylindrical rollers *b,* and *c,* are mounted; the latter of which has upon the end of its axis, at the outside of the vat a pulley, intended to be driven by a band, *d, d,* leading from a steam engine or other first mover, which drives the whole.

The roll of piece goods about to be dyed, is to be placed in the situation of *e,* and the end of the cloth drawn off the roll and attached by hooks or otherwise to the web or apron *f, f, f,* which is distended over and under the guide rollers *g, g, g.* The roller *c,* being now made to revolve by means of the band and pulley, drives the whole train, and causes the conducting web or apron to be drawn, and with it the distended cloth or length of piece goods over the first roller *g,* down into the vat, then along its bottom under the second and third rollers *g, g,* and then upwards out of the liquor over the fourth roller *g,* and between the central guide rollers to the roller *b,* where it continues winding on until the whole length is drawn off the roller *e,* the end of which is made fast to the web or apron.

The cloth or piece goods having been by these means passed once through the dye-liquor, that process may be repeated by reversing the action of the pulley, which will draw the web or apron and the length of piece goods back again from the roller *b,* and wind it on to the roller *c,* and in the same way it may be conducted to and fro, until the dyeing process is complete: when the end of the cloth or piece goods is to be passed between the two pressing rollers *h, h,* above, for the purpose of expressing the dye-liquor: and from thence it is to be conducted to the roller *e,* and wound thereon; this roller being actuated by the tooth wheel *i,* on its axis, which is driven by the train from the first mover, when thrown into gear by the handle *k.* [*Inrolled in the Inrolment Office, June,* 1828.]

To THOMAS SANDS, *of Liverpool, in the county palatine of Lancaster, merchant, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of certain improvements in spinning machines.*—[Sealed 18th November, 1830.]

THE Patentee describes this invention as consisting in "applying to the bobbins the whirl or pulley, which is usually fixed to the spindle, and in other arrangements connected with this change in the position of the whirl."

Pl. V. fig. 15. represents a spindle and flyer, a bobbin, the whirl and the rail or frames connected therewith, *a, a, a, a,* represent the spindle and flyer, on which spindle it will be seen that there is no whirl; *b,* is the bobbin, and *c,* is a hollow tube with a flat boss *d,* at the lower part of it, fastened to the lifting rail. The bobbin turns round this tube supported by the boss, and the spindle passes through the tube, resting as usual on the bottom rail, and thus having a motion wholly independent of the bobbin; *e,* is the whirl resting on the boss *d,* and turning loosely on the hollow tube *c.* The bobbin rests on the whirl which catches in it by means of a tooth or clutch, as shewn in the figure in the nature of a small clutch box.

If motion be given to the whirl by means of the ordinary band, it will be evident that the bobbin will be driven round at any required speed, while the thread which is shewn by the line *f,* will drag round the spindle and flyer, and in order that the bobbin and spindle shall not move at equal speed, the small piece of leather *g,* and weight *h,* are applied, and cause friction at the lower end of the spindle.

The leather is merely nailed on the bottom rail, and leaving a hole pierced in it, the lower end of the spindle is passed through this hole, and the weight causes a constant pull at one side of the hole against the spindle, and, of course, according to the size of the weight, so will the motion of the spindle be accelerated or retarded.

Fig.16, is only a side view of this contrivance. The Specification concludes by saying, "Now whereas I claim as the invention as aforesaid, the application of the whirl to the bobbin instead of the spindle, by means of the hollow tube, boss and clutch as hereinbefore described; as also the mode of regulating the speed of the flyer by means of the leather and weight applied as hereinbefore also described, and such my invention," &c. &c. —[*Inrolled in the Inrolment Office, May,* 1831.]

Specification drawn by Mr. Rotch.

To JAMES CARPENTER, *of Willenhall, in the parish of Wolverhampton and county of Stafford, and* JOHN YOUNG, *of the same place, lock-smiths, for their having invented certain improvements on locks and other securities, applicable to doors and other purposes.*—[Sealed 18th January, 1830.]

THIS is a tumbler lock, or latch, the novelty of which we do not perceive. Several levers or tumblers, as they are usually called, are made to confine the bolt of the lock, by means of pins, or protuberances, falling into notches; but when all the levers or tumblers are raised together to their respective proper heights, which is done by a key suitably formed, with steps on its edge, the bolt is free, and may then be projected. If, however, a false key is introduced, the steps on the edge of which are not accurately made, the tumblers will not all be raised to the proper height, and consequently the bolt cannot be moved.

These are the general features of locks with tumblers; and, though there may be some peculiarity in the disposition of the levers or tumblers of the improved lock under consideration, yet its principles being the same as others, and the precise features of novelty not being pointed out by the Patentees, or its particular advantages stated, we are unable to direct the reader to the specific matter of invention intended to be claimed under this Patent.—[*Inrolled in the Inrolment Office, July,* 1830.]

To JOHN HUTCHISON, *of Liverpool, in the county palatine of Lancaster, merchant, for certain improvements in machinery for spinning cotton, silk, linen, woollen, and other fibrous substances, which improvements have been communicated to him from a certain foreigner residing abroad.*—[Sealed 30th July, 1829.]

THESE improvements in machinery for spinning, consist in the adaptation and employment of a circular rim for the purpose of guiding the spun thread or yarn on to the taking-up bobbin, in place of the ordinary flyer.

The simplest mode of constructing this circular rim and of applying it, is, by forming a conical cap to be attached to a fixed spindle, the lower edge or rim of which conical cap being polished perfectly smooth, acts as a guide to the thread or yarn, and causes it to wind upon the bobbin.

Plate V, figs. 17 & 18, represent the spindle with the wolve whirl or pulley the bobbin, and the conical cap, complete and in working condition; figs. 19 and 20, are the same in section (similar letters referring to corresponding parts in all the figures.)

a, is the spindle, which may be about thirteen inches in length, of a cylindrical form, and about five-sixteenths of an inch in diameter, but tapered at the top to a point.

Supposing this improvement to be adapted to a throstle frame of the ordinary construction, a section of the front part of which, with one spindle, is shewn upon a smaller scale at fig. 21, the spindle would be securely fixed in the stationary bar or rail *b*, and held fast by a nut and screw, its shoulder resting on the upper side of the bar. Upon the spindle a sliding collar *c*, is placed, which being connected to a moveable bar like a traversing copping rail, ascends and descends upon the fixed spindle by the lever and heart movement by which the copping rail is commonly worked in spinning machines.

The wolve, whirl, or pulley *d*, turns loosely upon the spindle, its barrel bearing on the top of the sliding collar, and is driven by a cord from a rotatory drum as usual. The bobbin *e*, also slides loosely upon the fixed spindle, bearing on the top of the pulley, to which it is locked when in operation by a pin *f*, passing through the side of the bobbin and catching against an elevated part of the barrel of the pulley (seen most evidently in the detached fig. 19); hence it will be perceived, that the wolve, whirl, or pulley, and the bobbin, move together; *g*, is the hollow conical cap placed on the top of the fixed spindle, where it remains stationary, and is sufficiently large within to admit of the bobbin when empty to pass up into it, as in figs. 17 and 19.

Let it now be supposed, that the end of the roving of yarn delivered from the front drawing rollers *h*, fig. 21, is brought down on the outside of the cone and attached to the lower part of the barrel of the bobbin; the pulley, or wolve, being then put in motion, the bobbin revolves with it, and spins the yarn as it descends into a tight cord or thread, the thread flying round the cone and turning under its lower edge or rim: when from the resistance of the atmosphere, and the slight friction of the thread against the lower rim of the cone, the effect will be that the thread when twisted, will wind itself on to the bobbin, beginning at the bottom of the barrel of the bobbin, and progressively winding up the barrel as the bobbin descends out of the conical cap.

The movement of the traverse rail, by which the progressive winding of the thread up the barrel of the bobbin is produced, may be regulated in any of the ordinary ways by proper adjustments of the machinery of the spinning frame, according to the quality of the yarn or thread spun.

When the bobbin has become filled with the thread, the conical cap must be lifted off the spindle, the full bobbin may then be removed, and an empty one placed in its stead; and on re-

placing the conical cap, the process of spinning and winding may be carried on again as before.

The Patentee says, in conclusion, "I have described this improvement in spinning machinery as effected by the lower rim of a cone fixed on the top of a stationary spindle; it must be obvious, however, that there are other modes of effecting the same object. For instance, it may be effected by a polished ring of glass, ivory, wood, metal, or other suitable material, suspended by arms from the top of a fixed spindle, or the contrivance may be modified in some other way, I therefore desire it to be understood, that this invention and the subject of my claim of exclusive right under the above recited Letters Patent, consists in the adaptation to and employment in spinning machines (of whatever construction it may be applicable to) of a circular guide, suspended over or attached to the spindle in some of the ways herein proposed, and circumscribing the bobbin for the purpose of guiding the yarn or thread of any fibrous material, and causing it to be taken up or wound upon the bobbin as it becomes spun.—[*Inrolled in the Rolls Chapel Office, January*, 1830.]

Specification drawn by Mr. Newton.

To James Moffat, *of King's Arms Yard, Coleman Street, in the city of London, master mariner, for his having invented an improvement in apparatus for stopping and securing chain cables, also for weighing anchors attached to such chain or other cables, either with or without a messenger.*—[Sealed 3d June, 1828.]

The principal feature of this invention is a forked lever, which hangs upon pivots, for the purpose of stopping and holding the links of a chain cable in one direction, and allowing it to pass freely in the opposite. The contrivance is adapted both to a

box, through which the chain is to pass, and also to a capstan and windlass.

Plate IV. fig. 8, is a side view of the standards in which the box is confined; fig. 9, is a longitudinal section of the box, with a series of these forked levers mounted within it, which are shewn sideways; fig. 10, represents one of the forked levers detached; *a*, *a*, are two iron posts, or standards, fixed to a base, *b*, which, for the purpose of giving strength, are connected together by the side plate of iron *c*. Two similar posts, or standards, with the connecting plate, are also fixed to the base, immediately behind those shewn; and, between them, is confined the box with the forked levers, the frame work being strengthened with teak wood, filling up the vacant parts.

The chain, in passing through the box in one direction, as in weighing the anchor, raises the forked levers, as shewn by dots, in fig. 9; but, in moving back in the opposite direction, the levers fall, and admit only the perpendicular links between their openings, the horizontal links striking against the forks of the levers, by means of which the cable is stopped. But, when the cable is to be run out, as in letting go the anchor, the levers are to be raised, and kept up by pins inserted through the sides of the box.

The same sort of forked lever is to be adapted to a capstan or a windlass, giving way in one direction, but holding the chain securely in the opposite.—[*Inrolled in the Inrolment Office, December*, 1828.]

To GEORGE MINTER, *of Princes-street, Soho, in the county of Middlesex, upholsterer, cabinet, and chair manufacturer, for his having invented an improvement in the construction of, or making or manufacturing of, chairs, which he intends to denominate Minter's Reclining Chair.*—[Sealed 9th November, 1830.]

THIS is a reclining or easy chair, for invalids, in which the seat rises as the back descends, by means of a pecu-

liarly-formed joint, and which constitutes what the Patentee calls a balance action, by means of which, in whatever inclined position the back is placed, in that position it remains until the seat is pressed down, which brings the back again erect.

Plate IV. fig. 11, is a side view of the chair; fig. 12, is one side of the joint detached; *a* is the seat, stuffed with wool or horse-hair, as usual; *b* is the back, stuffed in a similar way; *c* is the joint, on which the back is movable; *d* is a projecting piece, fixed at the bottom of the back, and acting as a lever, having a roller at the lower end of it, which works at the under part of the side rail of the seat, for the purpose of raising it, as shewn by dots, the front part of the seat rising upon a hinge joint, at *e*. The more the back is depressed, the more the seat will be raised, that is, the nearer it will be brought into a straight line with the back; but, by pressing the whole weight of the body upon the seat, it will become depressed, and the back rise into its erect position.

The Patentee states his claim of invention to consist in the *balance leverage*, whereby the back and seat retain whatever position they are placed in by the pressure of the body alone, without the necessity of any other adjustment.—[*Inrolled in the Inrolment Office, January*, 1831.]

NOVEL INVENTIONS.

Mr. George Bunney, Lower Eaton-street, Pimlico, has invented an improved Surgical Belt, for which the Society of Arts have presented to him their Silver Isis Medal.

In cases where the scrotum or its contents are diseased or tender, a bag truss is usually had recourse to, in order to support and take off the weight of the part. There is

a difficulty in suspending such trusses so as prevent them from changing their place.

Where persons are inclined to corpulency, the weight of the intestines, making a constant pressure on the lower part of the abdomen, sooner or later causes the integuments to yield, and the lower part of the belly then projects in a way to be very uncomfortable, especially to those who, from motives of exercise, business or pleasure, are much on horseback. Belts of various kinds are applied in such cases, but generally with small effect, because it is difficult to make them pass in the right direction, and because they are very liable to shift their place.

Mr. Bunney makes his belt (for whichever of the above-named uses it is intended) an essential part of a pair of drawers, either of silk or cotton, made to fit extremely well, and supported partly by common braces and partly on the hip bones: he likewise inserts, when necessary, a small pocket containing a ball covered with leather, the pressure of which is quite sufficient to keep up any recent rupture.

Professional evidence of the novelty and utility of this invention was laid before the committee.

Mr. J. Roberts of St. Helen's, Lancashire, has received from the Society of Arts their silver Isis medal, for his adaptation of Reflectors to the Miner's Lamp, invented by Sir H. Davy.

THE principal objection to the use of Sir H. Davy's safe lamp is the feeble light which it gives, in consequence of the flame, which is not large, being enclosed by a cage of wire gauze; and this defect is greatly increased when, as often happens, the miner is at work in air mixed with

so much inflammable gas or carbonic acid, or a mixture of both, as to occasion the lamp to burn with a pale smoky flame. The explosion which, in such circumstances, would probably take place, is, it is true, prevented by this admirable invention; but any means by which the light of the lamp could be increased, or at least rendered more available to the miner, without impairing its safety, would greatly add to its utility. Each miner has, or ought to have, his own lamp; of which the only part of the light that is directly useful to him is that which falls on the spot where he is working: it is obvious, therefore, that if a reflector were placed behind the flame, much of the light that otherwise would be lost may be thrown to the precise part where it is wanted. The reflector employed by Mr. Roberts is of no regular curve, but approaches to that of the concavity of about a third part of a cylinder: it may be made of copper silvered or tinned, or of planished tin-plate, which is not only the cheapest, but, on the whole, the best, as being far less liable than silver to tarnish by the contact of sulphureous vapour.

In certain collieries, where the beds are thick, as at Whitehaven, and in the ten yard coal of Staffordshire, the miners are often required to work in the upper part of the galleries, where fire damp is very liable to collect, and where a lamp, even with a reflector, immersed in this inflammable air, will give but little light. For such cases Mr. Roberts employs a second concave reflector attached to the outside of the lamp by a jointed rod; which, enabling it to turn in any direction, allows the miner to place the lamp on the ground where the air is the purest, and consequently where the flame is the brightest, and by adjusting the exterior reflector, to direct the rays condensed by the interior one to the place where the light is wanted.

Trial has been made of Mr. Roberts's apparatus in a colliery near Bolton, the under-looker of which reports that, by means of it, a degree of light, quite sufficient for

every purpose, may be obtained at a distance of from fifteen to twenty yards from the lamp.

Mr. Roberts, who is a practical coal-worker, stated the following circumstances to the committee, which, though not directly connected with the subject of the preceding notice, may perhaps, without impropriety, be recorded.

Signs of the presence of inflammable air in a coal mine are, when the flame of the candle or lamp has a blue top, the length of such blue top being an indication of the proportion of inflammable air, and therefore of the hazard. This blue top is sometimes two and a half inches long; and when an explosion is imminent, it begins to dance on the top of the proper flame of the candle.

Signs of the presence of carbonic acid gas are when the candle burns dull and finally becomes extinct, previous to which the flame becomes smoky, is somewhat enlarged, and the least agitation of the air will put it out.

Signs of the presence of a mixture of both the above-mentioned gases are, when the flame has a long broad bushy top, sometimes six inches high; the flame is then, in Staffordshire, said to be *fire-fangled*. In these circumstances no explosion takes place; but if the proportion of carbonic acid increases, the flame goes out.

Those confined parts of a colliery which are imperfectly ventilated, and which, when cold, cannot be safely entered with a candle, cease to be so hazardous when warm. In such places the miner first enters without a light, takes off his jacket, and shakes it about to stir the air, and then falls to working with all his might till he is in a profuse sweat, in order that the place may get warm: he then steps out as quick as possible for his light, lest the place get cool: it is now safe as long as the miner continues at work; but if he ceases for a short time, the inflammable air shows itself by the blue top to his light, and the place becomes hazardous. If he leaves the place for a short time, he must re-enter it without a light, and with

all the precautions above-mentioned. After a miner has been thus working, the vapour, as the place cools, will stand in drops of the dew on the surface of the coal.

The efficacy of the above proceeding seems to depend, in part, on the carbonic acid produced by the breath of the miner, but chiefly on the aqueous vapour of his excessive perspiration; in confirmation of which Roberts found, while working in the coal mines of Whitehaven, that he obtained immediately the same advantage by throwing down before him a lump of quick lime and pouring water on it.

Dr. Clanny's safe lamp depends on the same principle of diluting the gas with steam.

AMERICAN PATENTS.

(*From the Franklin Journal.*)

For extracting cream from milk. S. Davis, New York.

The specification of this patent is in but few words; we therefore give it entire, as follows:—

"This improvement consists in putting zinc, commonly called spelter, into the vessel, or reservoir, containing the milk, or in depositing the milk in pans, or vessels composed of the aforesaid mineral, which decomposes the acrimonious substance that causes the milk to become sour, or rancid. And the same quantity of milk will yield a greater quantity of butter, and of a much finer flavour.

"What I claim is the manner of using the mineral called zinc, or spelter, in the reservoir, or vessels, contain-

ing the milk; and preparing vessels, or pans, from the zinc, or spelter.

We believe this application of zinc to be really " new,' whether we may add " and useful," we very much doubt. We cannot conceive of any action which can be exerted by the zinc, in an earthen milk pan, or of any which can take place between it and the milk, unless the acid of the milk, as it is formed, dissolves a portion of the metal, and in this case a poisonous salt will be formed. Zinc is among those metals which are most readily attacked by acids, and all its soluble salts are deleterious. If the effect is as stated, namely, that the milk containing the zinc will not become sour, or rancid, we know of no way in which this can be explained, but by the formation of metallic salt.

APPENDIX

To the Report of the Select Committee of the House of Commons, on Patents.

Papers delivered in by John Farey, Esq.

[British Law of Patents for Inventions.]

(continued from p. 100.)

Dr. Colquhoun, in his Treatise on the Wealth, Power, and Resources of the British Empire, quarto, 1815, makes the following account of Parliamentary rewards given for useful discoveries previous to 1788. Note, they are all in addition

to those grants for which express Acts of Parliament have been passed, as enumerated in the preceding lists:—

To Dr. Irvine, for his method of making sea water fresh and wholesome - - -	£. 5,000
To David Hartley, to enable him to ascertain the practicability and utility of his method of securing buildings and ships from fire -	2,500
To various persons, for discovering dyes useful in manufactures - - - - - -	5,500
To Charles Dingley, for erecting a public windmill for sawing timber - - - - -	2,000
To John Blake, Esq. to assist him in carrying on his scheme of transporting fish to London by land carriage - - - - - - -	2,500
	£. 17,598

Subsequent to 1788.

Parliament granted to Mr. Elkinston for discovering his mode of draining land - -	1,000
To Mr. John Davis, for his discovery of the method of cleaning smutty wheat, granted 1800	1,000
To be distributed by the Board of Agriculture in 1801, in premiums for essays on breaking up of grass lands - - - - - - -	800
To Thomas Foden, Esq. towards enabling him to prosecute a discovery made by him, of a paste as a substitute for wheat flour in 1801 - -	500
To Dr. Jenner, for promulgating his discoveries of the vaccine innoculation in 1802, a reward of - - - - - - - - - -	10,000
1807 a further reward of - - - - -	20,000
To Dr. Edmund Cartwright, for various mechanical inventions, granted in 1809 - -	10,000
To Captain Manby, as a reward for his invention of effecting a communication with ships stranded, and for expences in carrying into execution his plans for saving the lives of shipwrecked mariners, granted in 1810 and 1812	3,250
To Mr. Greathead, boat-builder, for his invention of a life-boat, affording greater security to the lives of seamen and others, in cases of shipwreck - - - - - - -	1,850
To Mr. Crompton, for inventing the machine for spinning cotton, called the Mule - -	5,000

To Dr. Smyth, for his discovery of nitric fumigation to prevent the communication of contagion, in 1813 - - - - - - -	£.5,258
Miscellaneous rewards at various times - -	1,305
	£. 77,463

Appendix (B.)

A List of the most important cases of Trials at Law, respecting Patent Rights, which have been reported in books of cases, or cited by Judges, as containing the principal decisions of the Courts of Justice thereon, since the Statute of Monopolies, 21 Jas. I. ch. 3. 1623: With extracts and quotations of the principal decisions of the Judges, as reported in the books of cases which are received as authentic reports, by the Courts.

In the case of Edgeberry against Stephens, in the Court of King's Bench, it was decided by Judges Holt and Pollexfen, that a Patent may be granted for a foreign invention.

"If an invention be new in England, a patent may be granted for it, though it was practised beyond the sea before; for the statute (21 Jas. I.) speaks of new manufactures within this realm; and if they be new here, it is within the statute, which was intended to encourage new devices, useful to the kingdom, and whether learned by travel or by study, it is the same thing."

This case was cited by Lord Chief Justice Eyre, during the trial of Boulton and Watt against Bull, in 1795, as "almost the only case that is to be found upon patent rights, under the saving of the statute of Jas. I. It establishes, that the first introducer of an invention practised beyond sea, shall be deemed the first inventor. The exposition of this statute, as far as usage will expound it, has gone very much beyond the letter; the words new devices are substituted for, and used as synonymous with new manufacture."—Salkeld's Reports, Vol. II. p. 446.

Jessop's case, of a Patent taken for a whole Watch, when the invention was only a particular movement in a watch. The Patent was therefore set aside.

Cited during the trial of Boulton and Watt against Bull, in 1795, by Mr. Justice Buller, who said, "A patent for an addition is good, but it must be for the addition only, and not for the old machine too. If the patent for an addition be confined to the invention, it can give no right to the whole machine, or to any thing beyond the invention." "May not other persons in the trade buy the new movement, and work it up in watches

made by themselves? If men do go to the inventor for the whole machine improved, it is an advantage he gets from the option of mankind, and not from any exclusive right or monopoly vested in him."

In the ease of the King against Mussary, tried Michaelmas Term, 12 Geo. II. the Chief Justice Lee laid down the following general rules:—

1. Every false recital in a thing not material will not vitiate the grant, if the King's intention is manifest and apparent. 2. If the King is not deceived in his grant by the false suggestions of the party, but from his own mistake, upon the surmise and information of the party, it shall not vitiate or avoid the grant. 3. Although the King is mistaken in point of law, or matter of fact, if that is not part of the consideration of the grant, it will not avoid it. 4. Where the King grants, by his "especial grace, certain knowledge, and mere motion," those words occasion the grant to be taken in the most liberal and beneficial sense, according to the King's intent and meaning expressed in his grant. 5. Although in some cases the general words of a grant may be qualified by the recital, yet if the King's intent is plainly expressed in the body of the grant, the intent shall prevail and take place.—Buller's Nisi Prius, p. 75.

Dollond's case. An action for infringement of his Patent of 1758, for a new method of making the object glasses of Refracting Telescopes. The Patent was supported. This was a most important invention.

Objection was made, that a patent for a mere method could not be sustained; also, that the specification merely described the principle, but not the mechanical construction: it stated, that the new object glass is a compound of two or more glasses put close together, whereof one was concave, and the other convex; those glasses being made of glass of different refractive qualities, and each glass adapted to the other, so as to correct the errors arising from the refrangibility of light (making coloured rays), and also the errors arising from the spherical surfaces of the glasses (making distorted images.) It was proved that a Mr. Hall had made such glasses in 1720, long before the date of the patent, but he never disclosed the secret.

This case was cited during the trial of Boulton and Watt against Bull, 1795, by Mr. Justice Buller: "As Dollond first made it public, he was held to be considered as the first ininventor." Dollond's telescopes are certainly a manufacture within the statute (21 Jas. I.): they consist of principles reduced into form and practice; and the patent is for glasses completely formed, not for mere principles. The specification

describes the manner in which the invention is to be carried into effect, with all the perspicuity of which the thing is capable." Also by Mr. Justice Heath, "I consider Dollond's patent to be substantially for an improved machine. "A patent for an improvement of a refracting telescope, and a patent for an improved refracting telescope, are in substance the same. The same specification would serve for a patent taken in either of those terms." And by Chief Justice Eyre: "Dollond's patent was perhaps objectionable, being for the method of producing a new object glass, instead of being for the new object glass produced; because the mechanism or process by which it was produced, though perhaps new, will be only useful as producing the new article."

Morris against Branson. An action for infringement of Morris's Patent of 1764, for a Machine with a set of working Needles to be applied to a Stocking Frame, for making Oilet Holes, or Net Work in Silk, Thread or Cotton. Tried at Westminster after Easter Term 1776, before Lord Mansfield. Verdict for the Patentee.

Objection was urged that a patent could not be maintained for an addition only, and Bircot's case (15 Elizabeth) was cited. Lord Mansfield said he had received a letter on that point, from one of the jurymen, which he mentioned to all the Judges: "that objection would go to repeal almost every patent that was ever granted:" his Lordship did not give a direct opinion, but a verdict was given for the Patentee, with £.500 damages, and no motion was made in arrest of judgment. This case was cited during the trial of Boulton and Watt against Bull in 1795, by Mr. Justice Buller, who said, "It may be collected that Lord Mansfield thought the above patent good; and since that time it has been generally received in Westminster Hall, that a patent for an addition is good, if it be for the addition only, and not for the whole machine too." Also by Mr. Justice Grose, on the trial Hornblower *v.* Boulton in 1799: "If a patent could not be granted for an addition, it would be depriving the public of one of the best benefits of the statute of 21 Jas. I."—Buller's Nisi Prius, p. 77.

About the year 1770, a considerable and increasing trade had grown up at Nottingham, in weaving mitts, handkerchiefs, &c. in open knitted work, by stocking frames, with additional machinery. They all originated from Morris's patent of 1764; and several other patents were taken within fifteen years after that. The Courts were often occupied with trials for infringements of them, but they are not reported. It appears that Bircot's case, in Queen Elizabeth's time, was often quoted, and also Sir Edward Coke's opinion in his Institutes, that a patent

cannot be for an addition to an old manufacture; but in the end Morris's patent was fully established, and some subsequent ones were set aside, as being on his principle.

Some patentee was nonsuited on the ground that his patent was taken for a new invention, when in fact it would not work alone without the old machine: this was stated in argument before Lord Loughborough, at the trial of Arkwright *v.* Nightingale in 1785: he said, "that objection has been overruled. In all the oylet-hole work patents, they are for additions to the old stocking frames, and they are not so described. I tried one of those causes last term, when objection was made to the description in the patent being inaccurate. I was of opinion that the description of what was invented was to be looked for in the specification, but it made no reference to the old machine." The same was the case with March's patent two years ago.

Liardet against Johnson. An action for infringement of Liardet's patent of 1773, for a Composition or Stucco, called Adam's Oil Cement for covering the Walls of Houses. Tried in the King's Bench at Westminster after Hilary term 1778, before Lord Mansfield. The Patent was set aside.

The term of this patent had been extended by an Act of Parliament in 1776.

The general questions on Patents are,—1. Whether the invention were known and in use before the patent; 2. Whether the specification is sufficient to enable others to make it up. The meaning of the specification is, that others may be taught to do the thing for which the patent is granted; and if the specification is false, the patent is void; for, after the term, the public ought to have the benefit of the discovery: hence the law requires, as the price the patentee should pay to the public for his monopoly, that he should, to the very best of his knowledge, give the fullest and most sufficient description of all the particulars on which the effect depends. Dr. James, in the specification to his patent for fever powders, only mentioned the ingredients of which they are composed, but omitted the proportions or quantities, and that would have been fatal to the patent if he had ever ventured to bring any action for infringement. In a case of a patent for trusses for ruptures, the patentee omitted what was very material for tempering the steel, which was rubbing it with tallow; for that Lord Mansfield held it void. Inventions are of various kinds; some depend on the result of figuring, others on mechanism, &c.; others depend on no reason, no theory, but a lucky discovery. Water tabbies were discovered by a man spitting on a floor-cloth, which changed its colour, whence he reasoned on the effect of

mixing water with oil or colours. This must, in the nature of things, depend on experiments; and others must depend on the proportions of the things used in the composition.—Buller's Nisi Prius, p. 76.

Williams against Brodie. An action for infringement of Williams's Patent for a Stove, with a Pipe for conveying Air into it. The Patent was set aside.

The merit of the invention was acknowledged, but the specification described the machine altogether, covering the old stove, which was an existing thing, instead of describing it as a new application of a new invention upon an old thing; hence a verdict was given for the defendant. Mentioned by Mr. Erskine, Counsel, on the Trial of the King against Arkwright in 1785.

Arkwright against Mordaunt. An action for infringement of Richard Arkwright's Patent dated 16 December 1775, for certain Machines for preparing Silk, Cotton, Flax and Wool for spinning. Tried in the King's Bench, after Trinity Term, July 1781. Verdict against the Patentee.

On the ground that the patent was void, from obscure and incomplete specification of the invention.—*Note.*—Eight other similar actions had been entered for trial, but after this verdict they were all dropped. No motion was made for a new trial. Another action was brought to trial in 1785.

In 1782 Mr. Richard Arkwright printed a case for the consideration of Parliament, relative to his invention of an Engine for spinning Cotton into Yarn; with his reasons for applying for an Act to confirm, connect, and consolidate his two patents (one dated 3 July 1769, for spinning machines, and the other dated 16 December 1775, for preparing machinery), so as to preserve to him the full benefit of his inventions, during the remainder of the term of the last patent.

It was proved during the trial, the King against Arkwright in 1785, that such a paper had been printed in 1782, and it was read in court; but it does not appear whether it was really brought before Parliament. This document is deserving of notice, because it states the origin of the invention of that spinning machinery, which has since grown to become an object of national importance.

Between 1732 and 1742, one Paul invented, and obtained a patent, for an engine for spinning of cotton; it was first tried in London, and afterwards at Nottingham, and much money spent, but without success. Also between 1752 and 1762, various machines were constructed by different persons for spinning cotton, wool, &c. into many threads at once, but without success.

In 1767, James Hargrave of Blackburn, in Lancashire,

succeeded in making a machine (since called Spinning Jenny) to spin 20 or 30 threads at once; his invention occasioned a riot amongst the work-people, by which he was obliged to leave the country; he went to Nottingham, and obtained a patent, but it was infringed, and an association was formed against him, which prevented his prosecuting the infringers: he died in obscurity and distress, though his invention came into use.

Mr. Richard Arkwright, after many years study, brought his spinning machinery to bear about 1768: he was a native of Lancashire; but fearing the same fate as Hargrave, went to Nottingham, and obtained a patent, dated 3 July 1769, for a machinery for making web or yarn of cotton, flax, or wool. He afterwards found it necessary to apply the same principles to the preparation, and took another patent, dated 16 December 1775, for certain machines for preparing silk, cotton, flax and wool, for spinning. During five years after the date of his first patent, Mr. Arkwright and his partners expended £.12,000 in machinery and buildings before any profit was made. The last invention was a very important addition to the first; and, by combining them, excellent yarn or twist was at last produced; but there was still much difficulty in establishing a trade; for the cotton manufacturers would not have the new yarn at any price, and the proprietors were obliged to weave the yarn into stockings and into calicoes; but the latter was restricted by the Excise, which rendered relief by an Act of Parliament necessary.

The manufacture of yarn being at length fully established, the demand for it became too great for the patentees to supply, and then they sold licences very extensively, so that at least £.60,000 has been expended in consequence of such grants. Mr. Arkwright and his partners have expended upwards of £.30,000 in buildings and machinery in Derbyshire, and above £.4000 in Manchester; and they have lost not less than £.5000 or £.6000 by injuries from mobs, and from fire. The saving of labour by this machinery is several hundred thousands per annum, and yet trade is so greatly increased, that many more people are employed, and can earn a comfortable maintenance, than were employed before. The same inventions may be applied with equal advantage to prepare and spin wool.

To prevent his inventions getting abroad to foreigners, Mr. Arkwright purposely omitted to give so full and particular a description of his inventions, in the specification of his last patent, as he would otherwise have done, believing, from the

concluding clause in the patent, that he need not so fully describe. His patent right being largely infringed, he was obliged to prosecute some infringers, although an association was formed to resist him; but, on a trial in the King's Bench in July 1781, a verdict was given against him, on the ground that his specification was not as full and accurate as the law requires. Having established a business that already employs above 5000 persons, and a capital of not less than £.200,000, he hopes to be relieved by Parliament, from the consequences of an unintentional error.

Arkwright against Nightingale. An action for infringement of Arkwright's Patent, 16th December, 1775. Tried in the Common Pleas, 17th February, 1785, before Lord Loughborough. Verdict for the Patentee.

It was pleaded, that it would be highly for the public benefit that the patent should be set aside. Lord Loughborough said, "We must never decide private rights upon any idea of public benefit; a cause between individuals cannot be determined upon consequential reasons, that it would be beneficial to the public that one should prevail. The law has established the right of patents for new inventions, if certain conditions are complied with. If the present had been a question of damages, I would have admitted evidence to show to what extent persons had practised the invention, on the faith of the former verdict against the patentee (in 1781); but only nominal damages are now asked. The clearness of the specification must be taken from persons in the business, having skill on the subject; its intelligibility is proved by several witnesses who have made the machinery, from no other instructions than what was conveyed by the specification." On this the verdict was for the plaintiff.

Note.—It was commonly insinuated, that collusion was used between the parties on this trial, to keep back all evidence against the specification, and thus obtain a verdict that should support the patent. A scire facias was soon after brought against the patent, and it was set aside.—Davies, Collection of Cases on Patents, p. 37.

The King against Arkwright. A scire facias to repeal Arkwright's Patent, 16th Dec. 1775. Tried in the King's Bench at Westminster after Trinity Term, 25th June, 1785, before Mr. Justice Buller. Verdict for the Crown.

During this trial, the Judge would not hear evidence on the allegation "that the patent is prejudicial to the king's subjects in general," which was explained to mean, that the invention could only be worked here with a monopoly, when it might be worked in other countries without, and thus it endangered the

removal of the trade. No notice having been given to the patentee of the particular facts which made the patent prejudicial, he could not come prepared to answer the objection, "it is merely consequential, and a question of law, whether the patent is prejudicial or not. The record should state what facts are to prove the general inconvenience, and then the patentee would know what he comes to answer; and if established by the jury that such facts existed, then it would be a question of law whether it was an inconvenience." It was contended, that the specification was obscure, ambiguous and defective; that it contained nothing that was new at the date of the patent, and that several things were not invented by Arkwright; a most voluminous evidence was given on both sides.

Mr. Justice Buller: "No proceeding by scire facias to repeal a patent, has occurred within my memory, though in former times they were certainly very frequent." Respecting the specification, "Different evidence has been produced now, from that on either of the former trials." A patentee must disclose his secret in his specification, so that others may be taught by it, to do the thing for which the patent is granted; it must teach what the art is, and put the public in possession of the secret, in as ample and beneficial a way as the patentee himself uses it. There is strong evidence of several sensible men, that know something of this particular business and mechanics in general, that they cannot do it, then it is not sufficiently described, to support the patent. In the case that Mr. Arkwright printed for the House of Commons, he admits that he has not properly described how the machines were made. Some articles in the specification are proved to be of no use; why load it thus? that could answer no purpose but to perplex." The specification does not distinguish between what is intended for preparing cotton, and what for flax or wool, although they require very different preparation.

On the other points, whether it is a new invention, and whether it was invented by the patentee:—"The law in general is very different on them, from what I have stated as to the specification; many parts of a machine may have been known before, yet if there be any thing material and new, which is an improvement to the trade, that will be sufficient to support a patent;" but it must be for the new addition only.

The beater or hammer for breaking seeds, and fining flax, is admitted not to be new. Another figure is admitted to have nothing to do with the machine, "it is very difficult to say how, with "a good motive, it came into the plan." The feeding-cloth for supplying cotton to the carding machine, and also the

crank, and comb, for stripping off the cotton therefrom, are proved to have been invented, and used by others, before the patent. The rollers for drawing out the cotton in preparing, are imperfectly described, and were made before the patent; they are the same as were in Mr. Arkwright's first patent of 1769 for spinning; and evidence is given that the first invention was communicated to him in 1767 by John Kay, who had made a model for Thomas Hayes, the real inventor. The two kinds of spindles and bobbins, which are represented as what may be used for roving, instead of the revolving roving-can, are admitted to be of no use.

On the 10th November, 1785, a Motion was made for a New Trial, but it was refused; and on the 14th, Judgment was given to cancel Mr. Arkwright's Patent.

Observations.—The inventions for which Mr. Arkwright took his two patents for spinning and preparing, have proved of immense value to the nation, they are universally employed for one great branch of cotton-spinning, called twist, for strong hard cotton thread, and still remain nearly on the system that Mr. Arkwright himself established, during the patents; also, when combined with the previous invention of Hargrave's spinning-jenny (which was done some years afterwards by Mr. Crumpton) in what is called the mule, they form the other branch of cotton-spinning for fine and soft yarn. The spinning of long wool, and flax, and the preparing of flax (after the stages of combing or heckling) are modifications of Arkwright's system; and also the preparing of short wool for woollen cloth, the spinning thereof being done by Hargrave's jennies.

The nation is chiefly indebted to Hargrave, Arkwright, and Crumpton, for this great accession of means of wealth. All that was proved on the above trials respecting the use of the invention before the patent of 1775, was amongst persons who had been set to work by what Arkwright had done under his first patent of 1769 for spinning, and many had been his workmen; they were none of them persons who were capable of establishing any thing, if it had not been for him. The spinning machinery, which Arkwright constructed to a considerable extent under his first patent, showed itself on trial to be incomplete without a corresponding system of preparing machinery, the want of that was also felt by every one who had set up such machines (and most of whom had done so in infringement of his first patent); he was himself incessantly engaged in experimenting, organizing, and arranging such a system; and others who were watching for the same object (and getting away his workmen whenever they could) appear to have used most of the items of his invention before his patent, and yet it is certain, by the subse-

quent results, that no one attained success in the system like Arkwright; of that success, the greatest part depended upon arrangements and judicious combinations, none of which were explained in his specification, but only an obscure statement of the principal items of invention, and most of those had been used before the patent by others, though without any great advantage, for want of suitable combination. His specification was unquestionably most deficient; but the substantial merits of his invention were much greater than what appeared during the above trials. It is worthy of remark, also, that those items of his specification which were pronounced useless, and which it was assumed that he must have introduced with an intent to confuse, are the origin of almost the only really important inventions which have been added in modern times to the system of preparing that Arkwright himself established in his own mills at Cromford in Derbyshire, during the existence of his patents.

Of the three inventors of spinning, Hargrave, Arkwright and Crumpton, to whom the nation have owed so much, the first was persecuted, and died in the greatest poverty, amidst a population who were rising to opulence by his means. Arkwright, possessed a vigour of mind to command, control, and instruct workpeople, far beyond the talent of a mere artist or inventor, and succeeded in realizing a princely fortune by his manufactory; but his money was not gained by virtue of his inventions, for the bulk of it was acquired after his patent was set aside; and others who invented nothing, but merely copied what he did, made immense fortunes by spinning as well as himself. Crumpton, whose combination of Hargrave's and Arkwright's inventions in the mule, has much more than doubled the national advantages conferred by his predecessors, was, like Hargrave, ruined in his circumstances, and languished in poverty during a long life, in the very towns which had grown up from insignificance to wealthy importance by the practice of his invention. In 1812, his case reached the knowledge of Parliament, and 5,000*l.* reward was given him; but it came too late to have the effect of removing the established impression, that an inventor is almost certain to be ruined, even if his invention succeeds, and proves ever so valuable to others.

Arkwright's case was thus cited by Mr. Justice Chambre, on the trial of Taylor v. Hare in the Common Pleas, 1805, "his patent was not overturned till near the time when it would have expired; "very lare sums had been paid for patent machinery, of which sums the main part was for the privilege of using the patent right; but no money, which had been so paid, was ever recovered back."

SOCIETY OF ARTS.

The Rewards adjudged by the Society during the present Session, presented to the respective Candidates, by Jos. Hume, Esq. V. P. at Exeter Hall, in the Strand, in the following Order:—

In the Class of Manufactures.

To Mary Hamilton, Ballinamucket, Ireland, for a hat of British leghorn, 2*l*.

— Mr. J. Bassett, Birmingham, for his method of binding tin pipes and tin-plate, the silver Isis medal and 5*l*.

— Mr. D. B. Rolt, 21, Friday-street, Cheapside, for silk from the garden spider (aranea diadema) the silver Isis medal.

In the Class of Chemistry.

To Mr. Robert Jowett, for his thermometer for corrosive liquids, the silver Isis medal.

— Mr. W. Mason, Margaret-street, Cavendish-square, for his melting pots for iron and brass founders, the silver Isis medal.

In the Class of Colonies and Trade.

To Sir James Jamison, New South Wales, for his method of extirpating the stumps of trees, the large gold medal.

— James Henderson, Esq. 2, Circus-road, St. John's Wood, for his communication on Pitoya bark, the gold Isis medal.

— Mr. D. Lockhart, Isle of Trinidad, for nutmegs and mace grown in a British West Indian Colony, the large gold medal.

In the Class of Design or Polite Art.

DRAWINGS OR PAINTINGS BEING COPIES.

To Mr. S. Barry, 34, Rathbone-place, for a copy in pen and ink of heads, the silver Isis medal.

— Mr. Edward Ward, 2, James-street, Adelphi, for a copy in Indian ink of figures, the silver palette.

— To Mr. J. Brain, 49, Bartholmew-close, for a copy in chalk of a head, the silver Isis medal.

— Mr. Frederick Fairholt, 8, Denmark-street, Soho, for a copy in water-colours of a landscape, the silver Isis medal.

— Mr. Henry Davies, 4, Baynes'-row Clerkenwell, for a copy in pencil of animals, the silver Isis medal.

— Miss F. Burnell, 14, Park-square, Regent's-park, for a copy in oil of an historical subject, the silver Isis medal.

— Miss Anne Hort, 6, South-street, Finsbury-square, for a copy in chalk of a head, the silver palette.

— Miss Langmore, 1, King-street, Finsbury-square, for a copy in chalk of a head, the silver Isis medal.

— Miss Augusta Eliza Cole, 33, Red Lion-square, for a copy in water-colours of a miniature, the large silver medal.

— Miss Ellen Cole, 33, Red Lion-square, for a copy in pencil of a landscape, the silver Isis medal.

To Miss Harris, 26, Lamb's Conduit-street, for a copy in water-colours of flowers, the silver Isis medal.

— Mr. J. Barah Swaine, 17, Queen-street, Golden-square, for a copy in chalk of a figure, the silver palette.

— Miss Elizabeth Setchell, 23, King-street, Covent Garden, for a copy in oil of a portrait, the large silver medal.

— Mr. Henry Papprill, 3, Gough-square, Fleet-street, for a copy in chalk of a landscape, the silver palette.

— Mr. R. H. Grundy, 77, King-street, Salford, for a copy in pencil of a landscape, the silver Isis medal.

Drawings or Paintings being Originals.

To Mr. R. S. E. Gallon, Royal Hospital, Greenwich, for an original portrait, in oil, the large silver medal.

— Miss M. Shakespear, 29, Upper Bedford-place, for an original composition in water-colours of fruit, the silver Isis medal.

— Miss J. W. Hurlstone, 20, Hermes' Terrace, Chelsea, for an original composition in oil of fruit, the gold Isis medal.

— Miss Elizabeth Crabb, 6, Hill-street, Peckham, for an original composition in oil of fruit, the large silver medal.

— Mr. Edward Ridley, 13, Foley-place, for an original historical composition in oil, the large silver medal.

— Mr. J. Bostock, 13, Old Cavendish-street, for an original portrait—a miniature, the gold Isis medal.

— Mr. Edward Upton, 5, Baldwin's-court, Queen-street, Cheapside, for an original portrait---a miniature, the large silver medal.

— Mr. Daniel Crosthwaite, 33, Bread-street, Cheapside, for an original portrait in oil, the gold Isis medal.

— Mr. J. Pasmore, 6, York-street, Covent-garden, for an original composition of still life, the silver Isis medal.

— Mr. Edward Rolfe, 3, Kennington-lane, for an original composition of still life, the large silver medal.

— Mr. W. Edward Frost, High-street, Wandsworth, for a finished drawing from the life, the silver Isis medal.

Drawings from Models.

To Miss Sharpe, Chiswick Mall, for a finished drawing from a bust, the silver palette.

— Miss Mary Anne Williams, 11, Charlotte-street, Bloomsbury, for a finished drawing from a bust, the large silver medal.

— Mr. T. J. Croggan, 12, Brixton-place, for a finished drawing from a statue, the silver palette

— Mr. J. Calcott Horsley, 1, High-row, Kensington, for a finished drawing from a statue, the large silver medal.

— Mr. T. Pitts, 5, Watkins'-terrace, Ebury-street, Pimlico, for an outline drawing of an anatomical figure, the silver palette.

— Mr. W. Dickes, 9, Temple-street, Southwark, for an outline drawing of an anatomical figure, the large silver medal.

Models.

To Mr. S. Manning, 17, Newman-street, for a bust modelled from the antique, the large silver medal.

— Mr. W. Pitts, 5, Watkins' Terrace, Ebury-street, Pimlico, for a bust modelled from the antique, the silver Isis medal.

— Mr. Augustine Aglio, jun. 36, Newman-street, for a bust modelled from the life, the silver Isis medal.

— Mr. Fred. Orton Rossi, Grove-street, Lisson-grove, for an original model of an entire figure, the gold Isis medal.

— Mr. Jos. Stephens, 8, Buckingham-street, Adelphi, for an original model of an entire figure, the large silver medal.

— Mr. T. Clifton Paris, Dover-street, Piccadilly, for original models of horses in sealing wax, the large silver medal.

— Mr. T. M'Carthy, 3, Trellick-terrace, Vauxhall-road, for a carving of a horse in ivory, the silver Isis medal.

Engravings.

— Mr. J. A. Wheeler, 9, Gray's Inn-passage, Bedford-row, for an engraving in wood of a head, the large silver medal.

— Mr. Hen. Bullivant, 20, Gainsford-street, Islington, for an engraving in wood of a head, the silver Isis medal.

— Mr. T. Clark, 42, Pratt-place, Camden-town, for an engraving of Chichester Cross, the large silver medal.

— Mr. J. Peake, 46, Clarendon-street, Somers'-town, for an engraving of machinery, the silver Isis medal.

Architecture.

— Mr. J. W. Hance, Edwards'-place, Kensington, for an original drawing of the North end of Westminster Hall, the silver Isis medal.

— Mr. J. Douglas Hopkins, 24, Goodge-street, for an original composition of foliage, the large silver medal.

— Mr. J. Johnson, Ravens'-place, Hammersmith, for an original composition of foliage, the silver Isis medal.

— Mr. Rd. Bickerton, 24, Tufton-street, Westminster, for a perspective architectural drawing, the silver palette.

— Mr. Jas. Wilson, 5, Lower Seymour-street, Portman-square, for a composition of foliage—a copy, the silver Isis medal.

— Mr. Elihu Towne, 29, King-street, Borough, for an original anatomical model in wax, the large gold medal.

— Mr. J. Smith, 4, Sandys'-row, Artillery-street, for his model of York Minster, the large silver medal, and 5*l.*

In the Class of Mechanics.

— Mr. P. Watt, 55, Fore-street, Lambeth, for an instrument for piercing sheets for bookbinders, 5*l.*

— Mr. S. A. Forster, 35, Frith-street, Soho-square, for a tail piece for a violoncello, the large silver medal.

— Mr. C. Bush, 65, Southampton-street, Camberwell, for a fruit gatherer, 5*l.*

To Mr. J. Donaldson, 18, Church-row, Pancras-road, for his handles for gravers and etching points, *5l.*

— Mr. James Braby, Duke-street, Stamford-street, for his machine for weighing coals in sacks, the large silver medal.

— Mr. W. Parsson, Great Guildford-street, for his slide rest for a turning lathe, the silver Isis medal.

— E. S. Graeff, Esq. 24, Southampton-place, Euston-square, for his apparatus to enable a woman who has lost a hand to work at her needle, the large Isis medal.

— Stafford Benson, Esq. 14, Jewin-crescent, Jewin-street, for his apparatus for reducing dislocations, the large silver medal.

— J. C. Jerrard, Esq. Honiton, Devon, for his bed for invalids, the large silver medal.

— Mr. W. Valentine, 16, Carburton-street, for his microscope for botanic dissections, the large silver medal.

— Mr. Cornelius Varley, 1, Charles-street, Clarendon-square, for his microscope for live objects, the large silver medal.

— Mr. Andrew Ross, 5, Albemarle-street, St. John's-square, for his dividing engine, the gold Isis medal, and fifty guineas.

The Thanks of the Society have been voted to

Mr. D. Weilamann, of Vienna, for his drag for four-wheeled carriages.

Mr. Bunney, of Lower Eaton-street, Pimlico, for an improved truss.

Mr. Fayer, of White Lion-street, Pentonville, for a hone for razors, and other articles of cutlery.

Mr. C. Varley, of Charles-street, Clarendon-square, for his paper on working iron and tempering steel.

Mr. Jas. Jones, of Well-street, Wellclose-square, for a double driver for a lathe chuck.

Holles Bull Way, Esq. of Beaminster, for a communication on the durability of American pine wood.

J. M'Arthur Low, Esq. Commander, R. N. for his improvement on Rennolds' repeating sextant.

Mr. J. Thomas, of Devandon Green, near Chepstow, for his paper on sundry horticultural subjects.

— Hoblyn, Esq. of Bath, for his paper on reclaiming waste land.

Mr. J. Goss, of Okehampton, for his paper on the effect produced on the growth of timber by lopping the branches.

The Earl of Macclesfield, for a specimen illustrating the great depth to which the roots of wheat penetrate.

J. Dombrain, Esq. Dublin, for his communication respecting a quarry of marble in the co. of Donegal.

ARTHUR AIKIN, *Sec.*

Scientific Miscellanies.

Mineral Forest.—A subterranean forest has been discovered in the coal formation near Glasgow. The trees are numerous: they occur many feet below the surface, and are vertically imbedded in the sandstone. The trunks of the trees are abruptly cut off by the superincumbent shale. The bark is converted into coal; but the woody structure for a considerable space downwards, is of a shaly nature.

Tanning.—An apothecary in the neighbourhood of Narbonne has published a Treatise, extolling the husks of grapes which have been deprived of their alcohol by distillation, as an excellent substitute for bark in tanning leather. After having prepared the skins in the usual manner, he places them in the pits, and covers them with the grape husks. From five and thirty to five and forty days are sufficient to complete the tanning. This method, according to the author, affords the following advantages:—The operation is much more rapid; it is much more economical; the leather has an agreeable odour instead of that of tan; and it is twice as durable as leather tanned by bark.

Novel Application of Steam.—Steam has lately been applied with great success in some of the French forts, in the destruction of vermin on board of great vessels. After having carefully closed the hatches and every aperture, the steam is suddenly introduced, and in twenty-four hours every living thing which may have been brought in with the cargoes is destroyed.

Fossil Belemnite.—It has hitherto been a matter of much speculation among geologists, whether the curious fossil, so abundant in some lime-stones, and known by the name of *Belemnite,* ever contained an animal; or if it was the spine of a sea-urchin, or not at all of animal origin. It appears, that a French naturalist

has satisfactorily solved this question, having found in the department of Farn, all the parts of the molluscous animal in company with the fossil.

Education of the People in France.—In no fewer than one hundred and nine cities and towns in France, institutions have already been, or are about to be established, at the public expense, for the instruction, by able professors, of a portion of the industrious classes of the people in the geometrical and mechanical knowledge applicable to the useful arts. The number of pupils is estimated at between four and five thousand. Such efforts are worthy of a great nation.

Volcanos in Central Asia.—The discovery of volcanos in the central plains of Asia which have always hitherto been considered to be in proximity to the ocean, is among the most interesting features in the late journey of De Humboldt. This celebrated traveller is about to present an account of these to the Academy of Paris.

Medical Botany.—The Medico-Botanical Society of London has offered a gold and silver medal for the best essays on the questions:—"What is the vegetable substance which could be employed with success in the cure of hydrophobia?" and "On the medical qualities and uses of any indigenous plant which is not yet sufficiently known, or on new uses and applications of any other indigenous plants.

Potatoes.—A French publication denies to Sir John Sinclair the merit of having discovered the means of producing a fine colour from the flower of the potatoe; and asserts, that the Frenchmen of science have long stated the practicability of applying the water and the flower of the potatoe for the purposes of dyeing. It says, that M. Fouques has shewn by experiments, that linen and cotton, plunged into potatoe-water, acquire a grey colour; and that, in 1817, a chemist of Copenhagen pointed out in a scientific journal, a simple method of obtaining a fine yellow from the flowers of the *solanum tuberosum*. He dyed with it linen, cotton, and even woollen cloth, which took a very solid green colour on immersion in a blue dye.

New Timber Tree.—The French Academy, from the report of some of its members, advise the introduction of the zelhoa or planera, formerly called twisted elm of Siberia, and which grows on the coast of the Caspian and Black Seas into our latitudes; it appears, that it promises well for carpentry, burning, and other purposes.

Literary Notices.

Dr. Lardner has published the eighteenth volume of his "Cabinet Cyclopediæ," containing Vol. II. of Sir J. Mackintosh's History of England.

If this work continues as it has begun, we would place it in the hands of the rising generation, as the most valuable and enlightened of commentaries on our English Constitution. Every page is marked by the reflection and knowledge thrown out by a mind as highly gifted as it is highly cultivated.

Sketches of Spain and Morocco.—By Sir Arthur Brooke. The author of "Travels to the North Cape of Europe" has, in these pages, gone over a great extent of ground, where but little novelty could be expected. He has also traversed parts of Africa, respecting the present state of which little is known. His work is pleasing and unaffected, though not decidedly elegant: and it is precisely one of those entertaining books of travel which are well calculated to suit the general reader, without presenting any strong claims to perpetuity beyond the limits usual to the genus of "Sketches."

Vol. IV. of Dr. Lardner's Family Library is "An Annual Retrospect of Public Affairs for 1831, Vol. II. The ability of the author must recommend the present volume: it contains an account of the Belgic revolutions, our own domestic politics, and the whole of the great political changes that have lately been proposed.

Mr. S. Leigh has published another valuable work, " A Guide to Wales and Monmouthshire," which, like all his previous publications, is neat and interesting. To any one in anticipation of the enjoyment of a tour through Wales, we recommend this volume as a very pleasant and useful accompaniment.

Mr. Bernay's German Poetical Anthology deserves every success; for, as a class-book for students, it certainly merits it.

The first part of the History and Antiquities of the County of Buckingham, by G. Lipscombe, M. D., quarto, is announced for publication; also a new History and Description of the Town of Woburn, its Abbey, and Vicinity; a Biography of the Russell Family; and a Guide to Woburn Abbey, with an account of the Paintings, Sculpture, &c. By J. D. Parry, M. A.

The long-expected Topographical Dictionary of England, by Samuel Lewis, in four volumes, quarto, is now before the public: it contains a vast collection of general information, as to the interior of our country, the ancient and modern state of the towns and villages, their origin, agricultural and manufacturing resources, public buildings, institutions, peculiar privileges, curiosities, and a variety of other matters, which appear to have been collected with great assiduity, and arranged with considerable care. The volumes are handsomely printed, by Bensley; and the maps very tastefully engraved, by Starling; the whole constituting a work of considerable merit, and comprehending a greater body of topographical information than any work heretofore produced.

Berlin.—There is now publishing at Berlin a periodical Review, entitled " Kritischer Wegweiser." The object of it is to improve geographical, mathematical, physical, and hydrographical science. The first part of the Review contains notices of maps, with remarks on their merits and defects. In the second part is given geographical and hydrographical illustrations and observations, with many useful remarks connected with various departments of science.

New Patents Sealed, 1831.

To William Dixon, of Walsall, in the county of Stafford, brass cock founder, he having had communicated unto him by a certain person residing abroad, an invention of an improvement or improvements on the cock or tap, applicable to fluids, liquids, and gases.—Sealed 21st April, 6 months.

To Joshua Taylor Beale, of Church Lane, Whitechapel, in the county of Middlesex, engineer, for his having invented an improvement in certain apparatus for separating a portion of aqueous vapour from the vapour of alcohol, in the process of distilling and rectifying spirituous liquors.—30th April, 6 months.

To George Stephenson, of Liverpool, civil engineer, for his having invented improvements in the mode of constructing wheels for railway carriages.—30th April, 4 months.

To William Gutteridge, of the parish of Saint John, Clerkenwell, in the county of Middlesex, civil engineer, for his having invented certain improvements in apparatus for distilling and other purposes.—18th May, 6 months.

To Robert Burton Cooper, of Battersea Fields, in the county of Surry, Esq. for his having invented an improvement or improvements on a cock or tap, applicable to fluids, liquids, and gases; and for applying the said improvement or improvements to other useful purposes. 18th May, 6 months.

CELESTIAL PHENOMENA, FOR JUNE, 1831.

D.	H.	M.	S.	
1	14	0	0	☾ in conj. with ♃ long. 22 in Cap. ☾ lat. 18 N. ♃ lat. 46 S. diff. of lat. 1 4
2	21	0	0	☾ in conj with λ in Aquarius
3	3	30	0	☾ in □ last quarter
3	18	0	0	♀ in conj. with κ in Gemini
5	0	0	0	⊙ before the Clock 2 min. 1 sec.
6	3	0	0	☾ in conj. with ν in Pisces
7	6	0	0	☾ in conj. with μ in Ceti
8	0	0	0	☿ Stationary
8	14	0	0	☾ in conj. with ☿, long. 29° in Aries, lat. 4 42 S. ☿ lat. 4 9 S. diff. of lat. 33
8	19	0	0	☾ in conj. with γ in Taurus
9	1	0	0	☾ in conj. with α in Taurus
9	18	51	0	Eclip. conj. or ● new moon
10	0	0	0	⊙ before the clock 1 min. 6 sec.
10	20	0	0	☽ in conj. with ν in Gemini
11	0	0	0	♃ Stationary, near μ in Cap.
11	9	0	0	☽ in conj. with ξ in Gemini
14	13	0	0	☽ in conj. with ♄ long. 27 in Cancer, ☽ lat. 18 N. ♄ lat. 1 33 N. diff. of lat. 1 15
15	0	0	0	⊙ before the Clock 4 sec.
15	0	0	0	☽ in conj. with ρ in Leo
15	22	0	0	♀ in conj. with γ in Cancer
15	23	0	0	☽ in conj. with σ in Leo

D.	H.	M.	S.	
16	15	59	0	☽ in □ first quarter
17	4	0	0	♄ in conj. with α in Leo
17	16	0	0	☽ in conj. with 1 γ in Virgo
18	10	0	0	☿ in conj. with 1 δ in Taurus
18	19	0	0	——— with 2 δ in Taurus
19	23	0	0	——— with ε in Taurus
20	0	0	0	Clock before the ⊙ 8 sec.
21	10	0	0	☽ in conj. with ψ in Libra
21	17	38	0	⊙ enters Cancer
21	21	0	0	☽ in conj. with γ in Libra
22	14	0	0	☽ in conj. with φ in Oph
24	19	0	0	Ecliptic oppositton or ○ full moon
25	0	0	0	Clock before the ⊙ 2 min. 4 sec.
25	21	0	0	☾ in conj. with d in Sagitt
27	6	0	0	☿ in conj. with ι in Taurus
28	4	0	0	☾ in conj. with ♅ long. 14 in Cap. ☾ lat. 45 N. ♅, lat. 41 S. diff. lat. 1 26
28	20	0	0	☾ in conj. with ♃, long 20 in Cap. ☾ lat. 1 N. ♃, lat. 41 S. diff. of lat. 1 41
29	22	0	0	♂ in conj. with δ in Cancer
30	0	0	0	Clock before the ⊙ 3 min. 6 sec.
30	3	0	0	☾ in conj. with λ in Aquarius
30	13	0	0	☾ in conj. with φ in Aquarius.

J. LEWTHWAITE.

The waxing moon ☽.—the waning moon ☾

METEOROLOGICAL JOURNAL,

For April and May, 1831.

1831.	Thermo.		Barometer.		Rain in inches.	1831.	Thermo		Barometer.		Rain in inches.
	Hig.	Low	High.	Low.			Hig.	Low	Hig.	Low.	
APRIL						MAY					
26	64	38	29,79	29,70		11	60	28	30,13	30,11	
27	61	41	29,62	29,54		12	64	32	30,09	30,00	
28	57	41	29,34	29,31		13	64	32	29,94	29,92	
29	60	34	29,23	29,20	,05	14	55	26	Stat.	30,00	
30	63	41	Stat.	29,20	,175	15	61	26	30,00	29,97	
MAY						16	68	34	30,09	30,02	
1	61	36	29,45	29 ,32	,025	17	69	34	30,12	30,11	
2	59	31	29,54	29,46		18	69	41	30,05	29,86	
3	61	37	29,60	29,56	,525	19	64	47	29,81	29,66	
4	56	39	29,56	29,52	,125	20	69	49	29,78	29,75	,2
5	53	31	29,52	29,48	,05	21	63	46	29,88	29,79	
6	50	30	29,79	29,64	,15	22	70	47	29,93	29,90	
7	58	20	29,99	29,92		23	74	49	29,90	29,82	
8	53	34	30,22	30,06		24	77	48	29,80	29,78	,05
9	58	27	30,24	30,19		25	74	50	29,82	29,78	
10	55	30	30,15	30,11							

The extreme cold of the night of the 6th or morning of the 7th, is worthy of particular remark. Since the year 1774, the period at which the Meteorological Journal was commenced, of which the above is a continuation, there is no instance therein recorded of the mercury in the thermometer having fallen to so low a degree; the month of January last was particularly cold, nevertheless the thermometer on the 6th or 7th inst. was 11,9 degrees below the mean height for the said month. The result of the effect produced upon vegetation, which has been so severely arrested in its progress, is extraordinary, and is in some cases attended with a considerable defalcation of fruit.

Edmonton. *Charles Henry Adams.*

Latitude, 51 deg. 37 min. 32 sec. N.
Longitude, 3 min. 51 sec. West of Greenwich.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XL.

[SECOND SERIES.]

Original Communications.

VI.—On the Employment of Machinery.

To the Editor of the London Journal of Arts.

Sir,—I once more obtrude upon your liberal indulgence, anxious to convince of their error, if possible, the discontented few, who, though ever most easy and careless in our prosperity, are always more ready to complain and find grievous fault in the hour of our adversity, rather than cheerfully put their shoulder to the wheel, and lend a valuable assistance, when danger demands from all, at least the service of an honourable example. A class of people this, who never discover any thing to be wrong until a summer's sun no longer shines upon them, and then like pettish wasps buz round, and sting the harmless flower, because bees have previously sucked the honey.

Ingratitude to a kind benefactor is at all times odious; but particularly so when exercised in return for former generosity, the author of which has been reduced to suffer under inability. Such a return for past favours is unworthy human nature, disgraceful, detestable, and base. Is machinery, the means by which thousands have amassed abundant wealth, the generous distributor to the wants of millions, upon the slightest reverse of fortune to be discarded as a mischievous production? As a willing and faithful servant it has ever been ready to obey our call; but because grown poor in our service, not from its own vices and excesses, but from the mismanagement of its masters, is it to be rejected, slandered, and suppressed? And because most able, even in its infirmity, to bear its share of the burdens of our country, are the weakness and misrule of half a century to be ungratefully heaped upon its exhausted frame?

Already have its energies been sufficiently cramped by the paralyzing attacks, originating from repeated indiscretions on the part of those who ought to have been its greatest friends and warmest supporters: to wit, an *expedient, judicious, liberal metallic currency* has been applied as a safe and wholesome remedy to invigorate its weak and debilitated, not to say total, state of inaction. This is administering lowering drugs to the faint and starving sufferer. Treatment worthy of, and in perfect accordance with, the abortive ideas of those who now proudly fancy that their wisdom has suggested this correct and decisive conclusion, viz. that machinery is an unnatural production, and consequently adopt such an unnatural method of restoration.

When we for a moment consider to what extent machinery has benefited—what an exhaustless resource it has ever proved in the hour of difficulty—the supposition

of advantage to be derived from its destruction, which some have formed, and would wish to experiment, strikes us as most extraordinary. Is it not absurd to cut off this our only and last resource in a time of increasing difficulty?

Return to hand labour. What will constitute the great advantage proposed to be reaped by such expensive delay in production? The buyer must give double the price for a scarce and inferior article, because the time and labour taken to produce it will be increased in that proportion.

All must be aware that great difference exists between the returns of fixed and circulating capital employed in business. Where circulating capital preponderates, its proceeds must either be sold for a price considerably more than the proceeds from a fixed capital of equal total amount, or else it must be much oftener reproduced with the addition of profit. For instance, if A. should employ 150*l.* fixed capital, and 50*l.* circulating capital, with profits at ten per cent. his proceeds from that capital must sell for 79*l.* 8*s.* If B. employs 150*l.* circulating capital, and but 50*l.* as fixed capital, with the same rate of profits, his proceeds must realize the sum of 173*l.* 2*s.* 7*d.* All money expended in wages comes under the denomination of circulating capital, whereas that vested in machinery is rightly considered as fixed capital, and applies more strictly according to the durability of the machine. If hand labour be chiefly used, the circulating capital must preponderate; therefore the rent of the manufactory, and the capital to manufacture with, must be more frequently reproduced to enable the manufacturer to preserve his original amount. Take away his machinery, the means of quick production, and it is evident that his capital must waste from a very insufficient reproduction. It may be said, let him employ more

labour. But to do this he must increase his circulating capital, to furnish wages for such increase in labour. He would thus only aggravate his distress and occasion further loss; for if it be disadvantageous to him in a small, it would be ruinous in a large amount.

Moreover, if hand labour be employed, every variation in the rise of wages will require (to produce the same quantity of goods) treble the amount of fresh capital, as would be requisite to do the same with machinery employed as a fixed capital. If wages rose six per cent. A. would require but an increase of 3*l.* to his capital, whilst B. having so great a preponderancy of circulating capital would require 9*l.* The profits of stock would fall to four per cent.; A. would then sell the proceeds of his capital for 73*l.* 12*s.* 2*d.*, whilst B. must sell his manufactures for 171*l.* 11*s.* 5*d.* From whence is this additional capital suddenly to spring? Our mines furnish little else than coal, lead, copper, tin, and iron. Gold and silver are not likely to be more plentiful when the articles for which they are exchanged are reduced in quantity and quality, and increased in price.

It may be urged, that if the proportion of circulating capital was generally increased, or expended in wages for labour, the employment of extra hands would benefit the community at large. This I deny. Any addition that is not actually necessary, is detrimental to the interest of the employer. I have previously endeavoured to show, that machinery increases rather than diminishes the quantity of labour; and here contend, that if from an insufficient reproduction of his circulating capital the resources of the manufacturer are being gradually consumed, his trade must equally diminish, so that he will shortly possess no means whatever to carry on the work of production. Would this be beneficial to the com-

munity? When the parent spring is exhausted, every proceeding stream must shortly run dry. If a few were enabled for a short time to furnish labour for double the number of hands, we must consider whether any permanent good would probably be established. I answer no. To counterbalance the effect of the few, we must remember the inability of hundreds, who in the loss of their machinery (their fixed capital) would suffer almost a total wreck. We want every thing to facilitate, nothing to retard the quickness and cheapness of production, or in the decrease of imports and exports our revenue will experience a heavy loss, our home demand will stagnate, universal ruin and national dissolution will stare us in the face.

It is well, to serve a base purpose, to hasten discontent and anarchy, to raise an unmeaning cry of *practice* opposed to *theory*—merely showing that great distress exists, but adducing groundless causes for it—merely unjustly to blame our machinery, the pride of our country. But the use of machinery can no longer be called a *theory*, we having obtained its beneficial results from the *practice* of nearly half a century. Would the *practice* of hand labour, let me ask, have raised England to be the commercial star of Europe, the splendour of whose glory was designed to illumine the whole world. Could the *practice* of hand labour have supported us, and satisfied our demands through many long years of expensive war? Can the practice of hand labour procure maintenance for a doubled population, when the best of capital, credit, is shaken to its very foundation; speculation cut to the heart by a cold, restrictive, metallic currency; when the demand and supply are both stagnant together for want of means, on the one hand, to originate, and capital, on the other, to execute; and to crown all,

when common sustenance and bare provision are utterly inadequate to feed one-fifth of those starving poor who are constantly pressing upon the means of subsistence.

The wish for, or even the bare idea of the immediate suppression or total abolition of machinery, is too ridiculous for any reasonable man to entertain. Its gradual suppression let us for a moment consider. Perhaps the most effectual way to accomplish *this desirable end* would be to raise a heavy tax upon every machine that is in work. This must raise the price of every article of consumption and render it unsaleable in the market, unless sacrificed with great loss. All hopes of a remunerating profit must be abandoned. Cheapness is now the order of the day throughout the whole of Europe. If we tax our productive power, and increase the price of our manufactures, we shall be playing the losing game, merely to give foreign rivals an easier and speedier conquest. This would be curious policy, to cut our own throats to relieve a temporary distress.

Another efficient method of causing the gradual and partial suppression of machinery would be, that of still further contracting our circulating medium. This, the weakness of one administration in part adopted; but I hope the wisdom of another will incline them to a liberal extension of our commercial means. What justice could there be in, what advantage could accrue, what good could result from, or what urgent necessity could suggest, such a line of expediency as that of checking speculation, curbing the spirit of invention, dispiriting exertion, and robbing credit, the parent of commerce, of an offspring which provided for her every want? Such policy reminds me of an old fable, in which we are told, that the legs refused to carry, and the arms to serve the body; and in this obstinate resolve, they continued till exhaustion and

the fears of approaching dissolution tamed their rebellious spirit, and insured future obedience. But if care be not speedily taken, our commercial body, and the very vitals of our commerce, our machinery, will be too far exhausted and too dangerously affected ever more to recover, or need the tributary assistance of its respective supports. Is not speculation the chief support and improver of commerce? Is not the reward of enterprise a stimulus to renewed exertion? Is not the ingenious spirit of invention most called forth and perfected when the demand upon our commercial resources is the greatest? And is not a well regulated, sufficient paper currency the extender of credit, the promoter of speculation, the producing cause of reward to exertion, and the stimulus of enterprise? all of which when in a flourishing state help to call forth, refine, and perfect that spirit of invention, which has enabled England proudly and fearlessly to boast her unparalleled superiority. It is evident, therefore, that in curtailing our currency, we must have injured the whole train of our commercial prosperity.

Is the suppression or abolition of machinery calculated to benefit our commerce, or to give an impulse to the latent energies of our people, and the wasting strength of our nation? As well might we affirm that breaking the crutch on which miserable, enfeebled age leans for support, would infuse vigour and facilitate its progress. Or that clipping the wings of the young fluttering bird would enable it instantly to soar. If I am the possessor of a number of machines, the rent of which are 100*l*. per year, and that by my own labour, they produce goods to the value of 150*l*.; take them from me, and you rob me of my all. "You do take my life in taking the means by which I live." If I occupy a manufactory at the rent of 200*l*. per annum, and my machinery with which it is furnished

stands me in a rent of 800*l.* per year in addition, by taxing it, you cripple me ; by suppressing its use, you ruin me. What is to become of those families who leaned on me for support ? I cannot furnish labour when the capital which provided it is destroyed. The want of employment thus wantonly aggravated must cause tenfold poverty, hopeless and irremediable starvation.

Propose to confine its suppression to particular cases, to limit its taxation to particular branches only—the effect must be sensibly felt throughout every branch. We cannot wound a limb without the body being a participator in its suffering, If I construct a piece of mechanism, and retard the completion of one part, the whole must suffer in that delay.

When we reflect, that nothing which we use, that nothing which gratifies luxury, or satisfies the demands of refinement, can be produced without the aid of machinery, and consider the consequent amount of capital which must be vested in this power of production, the loss which must result to the country, from its abolition, is too fearful, too tremendous, to contemplate.

If the destruction of machinery be an essential service to the country, why have punished those unfortunate men who lately laboured to do us so much good ? Hitherto a national service has been generously rewarded. It was well for those who by an untenable opinion, and fallacious assertions, sowed the seeds of discontent and animosity, to call in assistance, to quell a spirit of their own invoking ; to crush the monster of riotous anarchy, which themselves had raised. Plausible and specious conduct this, to goad oppressed ignorance forward to madness, and then to retreat into the security of peace and good order, either to avoid detection, or to wait the opportunity of a renewal. It matters little to the possessor of machinery whether he

be deprived of it, and ruined by that resistless and experienced depredator, the strong arm of the law, or by an excited, unthinking populace; only that with the latter such a deed would be the effect of mischievous ignorance, which time and perseverance, with friendly assistance, might remedy, and the sufferer recover to future prosperity; but, with the former, would be the grinding insult of ungrateful injustice, as irremediable, as cruel and ruinous. We cannot be too active in checking a rebellious spirit, the anger of discontent, or the rage of vengeful excitation; but it is gross negligence, criminal indulgence, to allow the instigators to rebellion, the promoters of discontent, the feeders of excitement, and the authors of illegal destruction, to escape unpunished; whilst the less guilty, deluded perpetrators, are promptly, but condignly, sentenced. It is useless to endeavour to remove the effect so long as the cause remains.

Allow me further to inquire whether, if the fixed capital vested in machinery were robbed from the country by an act of arbitrary legislature, would the sufferers tamely submit? Undoubtedly not. Property would be no longer secure; the little money, the small remains that were saved from such universal ruin, would leave this country to seek security in another; the public credit would be a broken bubble, the whole civilized Continent would mock our sinking glory; England would fall without one sigh of pity breathed forth for her fate, without one feeling of reverence or respect from an ungrateful world, tutored by her example; whilst we, who had enjoyed, I might say monopolized, the summit of commercial importance and national splendour, must stand trembling by, without the power or ability to save what could not longer benefit us; or without the wish (having once been masters of the

whole, in the beauty of perfection) now to possess a barely-rescued and half-shattered wreck.

It is as impossible for commerce to exist, or thrive without machinery, as it is for the arm to move when its muscular power is destroyed.

I desire, then, to know, is our commercial interest so unimportant; is our commerce, the main support of our country, so valueless as to be neglected, its power broken, its efforts weakened, and its productive means destroyed. It is a talent, which, if hidden and buried in the gloomy corroding dungeon of illiberality, must waste, perish, and decay; but if put out to usury, or employed in honourable speculation and profitable exchange, will return its enterprising possessors ten-fold, fifty-fold, one hundred-fold. Let its restrictive jailers pause, and well consider, ere they narrowly assign to commerce a limit in the spot on which it springs, or the narrow compass which its rising prosperity fertilizes. As well may they attempt to veil the mid-day sun, which, whilst they delight in the twilight darkness of their self-created shade, will illumine and fructify an eager and rejoicing world.

Commerce is a fruit which grows upon the tree of enterprise, rooted and nurtured in the bed of peace, plenty, and refinement. The spreading branches of its parent stock, clothed in all their richest variety, adorn our favoured land; whilst its seed, made serviceable in increasing our store of wealth, may improve and cultivate the rich garden of Europe. But if this tree be pruned and lopped till nothing but barren shoots remain; if its fruit be suffered to wither and decay, and we be careless to gather as prosperity ripens it; if its seed be carelessly and ignorantly scattered upon a degenerating and overburdened soil, without strength to rise or space to spread in, poverty, famine, and remorse, must haunt the minds of those

whose lazy and unskilful hands would induce ruin from so fair a field, so rich, luxurious, and prolific a fruit, so full a blossom, and so glorious a prospect of an abundant harvest.

I remain, Sir,

Your obliged, &c. &c.

H. C. Harris.

Stroudwater, June 20, 1831.

Art VII—Remarks on the Novelty and Utility required in an Invention, to be the Subject of a Patent.

To the Editor of the London Journal of Arts.

Sir,—It is a generally received doctrine that an invention, to be the subject of a Patent, must be new and useful, but it is not so well understood what constitutes novelty and utility, and how far either or both must exist.

Mr. Holroyd, in his Law of Patents, p. 19, says, "whether an invention be new and useful is a question of fact proper for a jury."

"But it may be safely laid down that whatever be the nature of an invention, whether the merit of it rests on discovery, or on improvement, novelty and utility must exist in a material degree."

Now inventions do not always contain novelty and utility in equal portions, but in some novelty is predominant, in others utility; in some the novelty is very great, the utility trifling, in others the novelty is just discernible, and the useful effect very great. And though it is very certain that the sum of the two must be considerable, yet it is not easy to say where the sufficiency of each begins. That can only be ascertained by examiantion of

the case upon record, where the sufficiency of novelty and utility of invention, has been brought into question.

In some cases where Patents have been supported, the novelty of the inventions has been trifling, and the merit of the Patents, on the strength of which they were supported, was their great utility. For instance, in Huddart's Patent for rope machinery, the novelty *per se* was only trifling, (see Davis's Patent cases, p. 265.)

But however trifling it might be, it had a very important effect, for by virtue of it, Captain Huddart made better cables and cordage, than had been made before, and the Patent was supported.

Again in Daniell's Patent of 1824, the invention was plunging cloth, made in the common way, in hot water, after it had been dressed; this would seem a very small amount of novelty or invention, but its effect was to produce a great improvement in the cloth; and assuming it not to have been practised before, the Patent was held good, and J. Fussell who used steam instead of hot water, for the same purpose, was held an infringer, and his Patent repealed. (See Appendix to the Report of the Committee of Patents, p. 211, the King against Fussell.)

Again, in Brunton's Patent, for improvements in ships' anchors and windlasses, and chain cables or moorings: The difference between Brunton's chain cables and Captain Brown's (who had preceded him) was a trifle. Captain Brown made his cables with twisted links, a wrought iron stay being fixed across the middle of the opening of each link to keep them from collapsing. The links of Brunton's chain cables were not twisted, but were made in the strongest form, and the stays across the links were made of cast iron, with broad ends adapted to the sides of the links, and embracing them. Brunton's links had come into general use for chain cables in place of

Brown's, who himself had also adopted Brunton's links. The jury considered Brunton's chain cable new and useful; and afterwards on a motion for a new trial, the Lord Chief Justice, Abbot, confirmed their opinion as to the *sufficient novelty* of the chain cable, although he held the Patent bad on other grounds.—(See Appendix to Report of Patent Committee, p. 206.)

In all these cases the novelty was *per se* inconsiderable; but such as it was, by being combined skilfully with mechanism or processes known before, it went to produce important results in the shape of better cordage, chain cables, and cloth, than had been produced before; so that the public got really better things than they had had before the inventions: therefore the inventions were held sufficiently new to comply with the law.

Absolute want of utility, or total failure in operation, of course avoids a Patent; as, however, such abortive inventions are rarely brought into court, there can be but few cases on record of decisions against them. But Patents have frequently been brought forward in court, grounded on inventions, in which the novelty has been more prominent than the utility, and in which the latter if not absolutely disproved, has failed to be established. Such patents have been generally brought forward merely as weapons of offence, to demolish other later patents for inventions founded on a similar principle, but differing somewhat in their practical combination and organization. As for instance, Balfour's Patent cited against Huddart's, in *Huddart* against *Grimshaw*.—(See Davies, p. 265, and Kirke and White's patent cited against Kneller's, in *Hallett* against *Hague*.)

In most of these cases, the patents, which have taken stand on their utility, have been maintained in spite of the preceding ones, which could not shew utility; that is, the

difference between the inventions, has generally been held sufficient to support the later patent.

It appears, therefore, from examination of the most important case, that utility is the quality most rigorously exacted by the law. For, first, of an invention, however novel, which has not succeeded in practice, and has consequently been useless to the public, is not suffered to clog the operation of a subsequent invention which does succeed, and which though it may differ little from the first in appearance, differs from it in reality in something, by virtue of which it produces a better result, as in Huddart's case before cited, and in the late case of Hallett against Hague, tried in the Court of King's Bench, 26th of February, 1831*.

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* In Hallett against Hague for an infringement of Kneller's patent,—Kirke and White had a patent, in 1822, "for a process for more rapid chrystalization, and for the evaporation of fluids at a comparatively low temperature." And Kneller took afterwards a patent for "certain improvements in evaporating sugar, &c."

It was contended by the defendants, who had the right of using Kirke and White's invention, that Kneller's specification described an invention essentially the same as Kirke and White's, although the construction of the one apparatus was somewhat different from that of the other; that hence, Kneller's apparatus came under Kirke and White's patent, and therefore that they had a right to use Kneller's apparatus as a mere modification of their own.

It was proved that Kirke and White's invention had not come into·use, and the defendants could not prove that it would answer the purpose, or was so effective as known methods of producing evaporation.

On the opposite side it was shewn, that the difference between Kneller's invention and Kirke and White's, whether trifling or not, sufficed to make Kneller's apparatus answer the purpose, of which proof was, that competent witnesses had tried it, and found

And, secondly, an invention which is held sufficiently new, and is also successful in practice, is supported against infringement by colourable evasions, as in the trials of Watt's patent; Clegg's patent for a gasometer in Crossley against Beverley; and Daniell's patent in the King against Fussell.

Hence we may conclude, that when commanding utility is proved, a moderate share of novelty is sufficient to satisfy the law, because the utility is held *per se* novelty. For if an invention produces that which the public had not before, and which they prize highly, the *result* is the novelty, and it matters little in fact or in law, whether the means by which that valuable and new result is obtained, be trifling or not. It is not meant to be asserted, that a good machine or process possessing no novelty whatever, is merely on account of its goodness a subject for a patent; but it is barely possible, that a new effect, a result much better than previous results, can be obtained by virtue of no change whatever in the means; and if there is a change, although it be small, yet if its effects are great, and if it produces a beneficial result for the public, by giving them something real and useful, which they had not before, it may be expected, that a patent, grounded upon such change in the means, will stand firm as to novelty.

The truth is, that great novelty is becoming daily a more rare and difficult thing to attain (*); and by reason

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it succeed upon experiment; and further, that it was in actual practice for trade at the plaintiff's sugar-house. Kneller's patent was supported against the infringement, and afterwards on a motion for a new trial, the verdict was confirmed by the court.

* This is not wonderful, considering that since the year 1675, 5539 patents have been granted (to say nothing of the inventions

of the minute subdivision that characterises the present state of the useful arts, and the great extension of production in every branch of them, minute differences in the means employed cause great difference in the results to the public. Hence there is value and merit in those minute differences; and it being daily more and more difficult to distinguish between them, we consider the results instead of the means, because in the former the good and the evil are magnified, so as to exhibit differences that the judgment can seize, as a microscope will make visible differences between things, that to the naked eye appear similar.

ART. VIII.—ON LOCOMOTIVE CARRIAGES.

To the Editor of the London Journal of Arts and Sciences.

SIR,—If you consider this worthy a place in your widely circulated Journal, you will oblige me by inserting it.

I believe it is universally admitted, that the power of traction in locomotive machines as now constructed, particularly on the Liverpool and Manchester railway, depends not alone on the power of the engine, but on that combined with the weight of the machine; weight being necessary to produce adhesion: it is therefore clear, that any additional power being given to the engine without a proportionate increase of weight, would be of no advantage.

To obviate the evils arising from excess of weight, *i. e.* loss of power, destruction of rails, &c. I would recommend

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for which patents are not taken), and considering further that hardly a month passes without two or three inventions on the same subject.

that one, if not both the wheels on the same side of the carriage, if more than one is found necessary to produce sufficient adhesion, should be prepared each with a loose flanch or ring so formed as to be capable of moving in a line with the axis, but incapable of revolving without the wheel to which it is attached. Four or more strong springs, either simple or spiral, must be so placed as constantly to force or draw the moveable flanch or ring toward the wheel. Thus, the flanches or rings being brought in actual contact with the rail which they grasp, the quantity of friction or adhesion between the sides of the rail and the rings may be regulated either by a screw to each spring, or by one screw connected with the whole of the springs; and to be so constructed as to enable the attendant to increase or diminish the grasp, that is, the power of traction at pleasure, when the machine is in motion. If this suggestion is adopted, it may readily be applied to many existing railways, the only expense to be incurred being a slight addition, in all probability, to only one wheel in each carriage.

Yours, &c.

Birmingham, 28*th May,* 1831. U. C.

Art. IX.—Dr. Haycraft on Surcharged Steam.

(Continued from page 130.)

There is a great advantage in using high pressure steam of a much *greater* pressure than can be employed in ordinary engines. My brother, Mr. Samuel Haycraft, of Birmingham, has found, by experiment, that in increasing the pressure, the quantity of steam used is not increased in the same proportion, but that the quantity is as the

square root of the pressure ; that is, if we increase the pressure fourfold, the quantity of steam required will be only twice as much, by which there is a saving of half the steam. If we increase the pressure nine-fold, the quantity of steam is increased only three times, by which there is a saving of two-thirds of the steam, and so on in the same proportion. But this cannot be effected to any extent in ordinary engines, because neither metallic nor hemp packings are sufficiently tight at high pressure. But we have shewn that by means of the arrangement proposed in our improvements, our packings are able to sustain a pressure of more than 600lbs. on the square inch, without leakage. It is by a combination of the principles of working high pressure with surcharged steam, that the greatest advantage is to be derived; thus we found in an experimental engine, working at 200lbs. pressure on the square inch, with surcharged steam, the expenditure of steam was only one-tenth of the quantity used, when the steam was not surcharged, and working at 30lbs. on the inch, although the power was increased six-fold; shewing in this case, that the power produced from a given quantity of steam, was increased sixty-fold, the engine working perfectly tight the whole time.

The twelve-horse power engine above referred to, has been constructed agreeably to the plan laid down. The boiler is of a size usually adapted for a four-horse power, and works the engine at its full speed, and at a full power of twelve horses, calculating 220lbs. pressure on the piston for each horse, exclusive of friction. The boiler evidently makes more steam than is necessary, the steam constantly escaping by the safety valve when the engine is going at its full power, although the fire is kept low and the boiler is only set in a temporary way, with a

very short chimney. The engine also works under the disadvantage of being completely exposed to the open air. The boiler is of the strongest form, being a cylinder twenty-six inches in diameter and ten feet long, and is made of the best hammered iron, and has been proved to above five times the pressure required. This engine is computed to consume one-half a bushel of coals each hour, being about one-half of the quantity required in a Woolf's engine of the same power.

In this engine we have not attempted to carry the surcharging and high pressure to its greatest possible extent, as without it the effect sufficiently answers our expectation; and the saving of fuel is so great as to make any further saving, at least in a land engine, of comparatively small consequence.

But the superiority of this engine is not confined to its saving in fuel, for it is evident that its saving in water is still greater. When we consider that in all engines, and especially in high pressure ones, a great quantity of water is thrown up from the boiler into the cylinder with the steam, which has been estimated by practical men to be full one-half of the whole quantity used, we shall perceive, that, as by the surcharging plan, the whole of the water is converted into steam, the saving of water will be twice as great as the saving in steam. Now the saving of steam is, on the lowest calculation, *compared with ordinary high pressure engines,* three-fourths of the whole quantity; the surcharged steam engine requiring only one-fourth of the coals, and one-eighth of the water.

In applying this to the subject of locomotive engines, we will consider it in the following manner:—First, the load required for supplying the engine, consists of one part of coals to six parts of water; because, one pound of coals will boil off six pounds of water. Therefore, if we sup-

pose the load necessary to supply the engine to be two tons,—

	cwt.	qrs.	lbs.
The weight of the coals would be -	5	2	24
The weight of the water - -	34	1	4
	40	0	0
By the use of the surcharged steam engine, the quantity of the coals would be	1	1	20
The weight of the water - -	4	1	4
	5	2	24
So that there would be a saving of the load required equal to - - -	34	1	4

The great advantage of lightening the load in a locomotive engine, especially if intended for the road, is self evident; it will, in effect, be increasing the power of the engine and the velocity of the carriage. Also, by thus lightening the load necessary for the engine, we shall be able to carry such an increased supply, that we may be able to propel the carriage three or four times the distance without replenishing. We shall also be able to increase the steam power to a great extent. It must be familiar to the reader, that the two obstacles to the complete success of steam carriages on common roads are, the want of steam power adequate to the load required, and the too frequent necessity for stopping to take in a fresh supply of water and coals. These two obstacles the surcharged steam engine will completely remove.

The surcharged steam engine may also be made more compact in its form than any other, arising chiefly from the smallness of the boiler or generator required.

It should also be observed, that this estimation of the saving of fuel and water is on the least favourable scale. I have shewn, that by combining a considerable pressure

of steam, with surcharging it to a considerable degree; the power produced was increased sixty-fold, compared to that produced by an equal quantity of steam not surcharged. This astonishing effect was produced by the application of a gentle fire directly to the surcharged end of the cylinder. This engine has been frequently worked for several hours during many months: yet although the cylinder is of brass, it was never in the least injured by the fire, and the piston, packing, and other joints were always perfectly tight. Even should it be apprehended that in the course of time the cylinder might be injured, that part of it which is exposed to the fire may be replaced in a few hours by a new spare piece, without disturbing the working part of the cylinder, or the piston, &c. On this plan, the saving of steam may be carried on to an almost unlimited extent.

The only objection of moment which has been made by the many practical men who have seen the engine is, that owing to the large size of the piston rod, which, in fact, may be considered as a second piston, there is an increase of friction. This is certainly true; but at the same time, the advantages arising from the arrangements are so great, and the power so much increased, that it must be considered in the same light as Watt's addition of the air pump to the condensing engine, which, although from its friction, &c. it requires some power to work it, yet at the same time it adds so much more power to the engine, that on the whole it is a real improvement. From the small size, however, of the cylinder in this engine, it is evident, that its friction must be less than that of a condensing engine.

Many also object to the use of high-pressure engines, from a mistaken idea of the danger attending them. Perhaps on the whole, however, they are even safer,

owing to the greater precaution used in having a boiler or generator of the greatest possible strength. In the engine we have erected, the boiler has been proved to be above 500lbs. on the square inch, so that it would require an error of more than 400lbs. on the square inch to render it unsafe, which error cân hardly happen: while few low-pressure boilers would be safe at a pressure of 25lbs. on the inch, and an error of 20lbs. should the safety valve be obstructed, would be dangerous. In the surcharging engine especially, the boiler is so small, that its safety is secured. The reader is aware, that Woolf's engine, as improved by Mr. Hall, works with a high-pressure boiler, yet its working gives general satisfaction. The surcharged steam engine may, indeed, be considered nearly the same in one principle as Woolf's, namely, the working with surcharged steam, excepting that in the latter, only slightly surcharged steam is used; in our engine the steam is completely surcharged, and the full advantages of the principle are thereby obtained. Woolf's engine, also from its being on the condensing plan, cannot, of course, be used for locomotive purposes, and from its being somewhat complicated, is not well adapted for navigation purposes, although for mills, &c. it is the best engine yet known. The surcharging engine, from its compactness, its great saving in coals and water, and increased power, is peculiarly adapted for these purposes, and there can be little doubt but its use must become general.

To express in a few words the principal feature of the surcharged steam engine, we wonld say, that it accomplishes the important desideratum of having a perfectly steam tight piston packing. It should be recollected, that it was the opinion of the celebrated Watt, that the chief cause of the waste of steam in the steam engine, was the want of tightness in the piston packing; and it is known

that he laboured many years in endeavouring to effect this object. Since that time it has been attempted by many of the most skilful engineers without success, and it has not been without great labour and expense that it has at length been effected.

The other feature is, that by means of a prolonged piston or plunger, there is a complete separation between the surcharged end of the cylinder and its working part, by which means the steam can be worked in a completely surcharged or rarified state, and the piston being also covered constantly with water, is effectually preserved from injury.*

Recent Patents.

To William Church, *of Haywood House, near Birmingham, in the county of Warwick, Esq. for certain improvements in machines for propelling vessels and other machines capable of being propelled by steam, and in boilers applicable to the same, and also to other purposes.*—[Sealed 15th October, 1829.]

These improvements in machinery for propelling vessels, and other machines capable of being propelled by steam, consists in the peculiar construction and arrangement of several of the parts and appendages necessary to the construction and working of the steam engine, which are designed for the purpose of rendering the engine as a whole, more compact, less ponderous, and at the same time capable of exerting a greater effective power than any other engine hitherto made in proportion to the quantity of

* For Haycraft's Patent, see Vol. VI. p. 270.

steam employed under a given pressure; and also in the construction and arrangement of the paddles or wheels for propelling ships, boats, and other vessels, by the agency of steam. The improvements in boilers applicable to these engines, and also to other purposes, consist in a peculiar mode of connecting a series of vessels to constitute a boiler for generating steam, and forming passages for the flow of the water and steam, and the flues by which the fire and heated vapour is conducted, and made to act upon the water with better effect than has been heretofore done in any other construction of boiler. And further in a new contrivance adapted to the apparatus for supplying the furnace with fuel, and in an appendage to the safety valve; all which said improvements are fully set out on the accompanying drawings, and will be perfectly understood by reference thereto, with the assistance of the following description:—

Plate VI. fig. 1, is the elevation of the steam engine, complete, designed for propelling vessels, as it would appear when seen on the side.—Fig. 2, is an elevation of the same, taken on the right hand of fig. 1.—Fig. 3, is a representation of the engine, as seen from above.—Fig. 4, is a section taken through the engine in a horizontal direction, at the line A, B, in figures 1 and 2.—Fig. 5, is a vertical section, taken through the cylinder in the line C D, in fig. 4.—Fig. 6, is a section taken vertically through the air pump, hot water cistern, and force pump, in all which several figures the corresponding letters refer to similar parts of the engine. The cylinder is inclosed within a jacket *a, a,* and receives the supply of steam from the boiler, through the pipe *b,* which leads into the passage *c, c,* extending up one side between the jacket and the cylinder, and over the ends between the end plates *d, d,* and the outer caps. The end plates, *d, d,*

of the cylinder are perforated, for the purpose of forming passages for the induction and eduction of the steam, which passages are opened and closed alternately by a sliding valve *e, e,* fitted to each end plate, and working between it and the top or bottom cap or casing, the lower slider *e,* being held up to the lower plate *d,* by springs.

We proceed to describe the construction of these end plates *d, d,* and the sliding valves *e, e,* with the method of actuating them.—Fig. 7, is a horizontal view of one of the end plates, as it would appear on its outer surface.—Fig. 8, is a section of the same, that is, about an inch of the thickness of the plate on the outer side, being removed for the purpose of exhibiting the eduction apertures and recesses within the said plates.—Fig. 9, is one of the sliding valves, detached, as it would appear on that side which acts against the outer surface of the end plate.

Let it now be supposed that the steam from the passage *c, c,* is in the act of entering the cylinder through the upper end plate (as in fig. 5), in order to depress the piston, the upper sliding valve *e, e,* must be in such an advanced situation as shall leave the induction apertures open, when the steam passing freely round the upper slide valve, will enter the cylinder at the apertures *f, f*; at the same time the lower slide valve *e, e,* will have receded, shutting off the steam at the lower part of the cylinder, and opening the apertures *f, f,* in the lower end plate *d,* to the recesses in the slide valve, and through them to the cavity and eduction passages of the end plate, from whence the volume of steam that had previously acted in raising the piston, will now pass off into the chamber *g, g, g,* within the jacket surrounding the cylinder, as shewn in figs. 5 and 8, and from thence through square passages *j, j,* figs. 2 and 4, to the condensor, which is formed by the pedestals of the frame-work. The sliding valves *e, e,* are

connected by rods *h*, *h*, to cranks at the ends of the vertical shaft *i*, *i*, which shaft being driven round, works the sliding valves to and fro, and produces the induction and eduction of the steam, which puts the piston in action, as above described.

The shaft *i*, is put in motion by means of a peculiarly formed cross, or star-wheel *k*, fixed upon the shaft, as seen in figs. 1, 3, 4, and 5. This cross or star-wheel has four grooves cut in it in radial directions at equal distances apart, which grooves are intended to receive the tappets that are to drive it round, each one-fourth of a revolution; and between the grooves the periphery of the star-wheel is cut into as many concave segments, which are designed to work against the circular part of the rotary tappet wheel *l*, seen best in the horizontal view, fig. 4. This tappet wheel consists of two segment plates, the one fixed on the vertical shaft *m*, the other adjustable thereon, and both are driven round by bevel-gear above, connected to the rotary horizontal shaft which works the air pump. Upon the tappet wheel segments there are two pins or tappets *n*, *n*, one of which, at about every half revolution of the wheel, strikes into one of the radial grooves of the star-wheel *k*, and turns it one quarter of a revolution. Thus it will be seen, that, in every quarter of a revolution of the star-wheel, the cranks on the shaft *i*, will be moved one quarter round; which, by means of the connecting rods, will, at every such movement, shift the sliding valve *e*, *e*.

Now, supposing that the sliding valves stand in the situation shewn in fig. 5, the upper one projected forward, leaving the passages *f*, *f*, open for the induction of the steam into the upper part of the cylinder, and the lower one drawn back, shutting off the steam, and opening the eduction for the discharge of the steam from the lower

part of the cylinder, the first movement of the star-wheel will draw the upper slide valve back a short distance, and push the lower one forward; this will merely have the effect of shutting off the supply of steam at the upper part of the cylinder, allowing that steam which is within the cylinder to expand, and force the piston through the remainder of its stroke. The second movement of the star-wheel will cause the upper slide valve to open the eduction passages from the upper part of the cylinder, and at the same time the lower slide valve will be so situate as to admit the steam into the lower part of the cylinder, in order to raise the piston. The third movement of the star-wheel will place the parts in the same relative situations as the second; and the fourth movement will bring them to the situation from which we started, as shewn in fig. 5. Thus a continued rotation of the tappet wheel will, through the intervention of the star-wheel, put the valves in action, and cause the engine to perform its functions.

Here, it should be observed, that the tappet on the fixed segment above described, is that which is employed for opening the induction, and for opening and closing the eduction passages, and the adjustable tappet for closing the induction only. The jet of water for condensation being injected into the condensor in the ordinary way, flows with the condensed stream along the passage *n*,* figs. 6 and 4, to the foot valve *o*. The construction of the air and hot water pumps will be best seen in the section fig. 6, where the water having reached the foot valve *o*, passes through it into the cylinder of the air pump *p*. The depression of the bucket *q*, will cause the water to flow through the clack valves *r*, *r*, and, by the rising of the bucket, the water will be lifted into the cistern, and made to flow away at the waste pipe *s*.

The bucket is made tight, by packing *t, t,* which is confined by a circular gland, capable of being tightened up by nuts on the outside. The piston rod of the air pump constitutes the plunger of the hot-water pump, which is a hollow cylindrical tube or rod *u,* with a valve at top, opening upwards. On the descent of the plunger a vacuum is produced in the barrel *v,* of the hot-water pump, into which the water from the cistern flows, by small apertures, through the hollow rod into the pump barrel; and, on the ascent of the plunger, the volume of water occupying the barrel is carried forward through the valve at the top, by a pipe, to supply the boiler. It is to be observed, that, by the general arrangement of the several parts of the engine above described, the weight of the piston, with its rod and other appendages, is balanced by the atmospheric pressure on the bucket of the air pump, and the weight of the parts appending thereto.

In order to effect this important advantage, the action of the crank shafts may be conveniently connected together by spur wheels *w, w,* fixed respectively on the ends of the crank shafts of the piston, and of the air pump, in such positions, that, when the piston of the engine is ascending, that of the air pump is descending, and *vice versá.*

The power of the engine is communicated by the piston rod to the cross head, to which the perpendicular rods *x, x,* are affixed, extending down on both sides of the cylinder. To the lower ends of the perpendicular rods, the connecting rods *y, y,* leading from the cranks of the main shaft are attached by pins, which are the axles of the anti-friction rollers *z, z,* working between guides affixed to the inside of the frame work. The main shaft having thus obtained its rotatory motion, the power may

be communicated from either extremity of the shafts, to propel or drive other machinery.

In constructing a steam engine with these improvements to be used for raising water or other stationary purposes, it is proposed to place the cold water pump immediately under the centre of the steam cylinder, in such a way that the axis shall coincide in the manner shewn in fig. 10, which is a front view of the engine, and fig. 11, is a side view of the same.

The perpendicular side rods *x*, *x*, as described above, are extended downward below the base of the cylinder, and their extremities attached to the cross beam A, and the connecting rods *y*, *y*, leading from the main cranks, are also attached to the end cross beams, as sweep rods are usually connected to cross heads.

To the centre of the beam the plunger or piston rod B, of the cold water pump C, is attached, and which extends downwards into the working barrel, forming a parallel motion for both the steam piston and pump rod.

When this pump is simply used for the supply of the engine, it is sometimes constructed in such a manner as to produce a double action, raising the water in the first place from the well, and then after it has passed through the filterer, carrying it forward to the engine. The rising main D, is a tube fixed by a flange in the bottom of the cistern E, having a valve at top opening upwards. On the outside of the tube D, the plunger B, is intended to slide, being made tight by a stuffing box, which plunger B, works in the barrel O, also made tight by a stuffing box, both of them being at top. The ascent of the plunger B, produces a vacuum within the barrel of the pump, causing the water to rise through the main D, into the plunger, and on the descent of the plunger the water so raised is become displaced by the plunger, and is caused

to flow through the valve at top over into the cistern. In the lower part of the cistern there is a false bottom supporting a filterer through which the water descends, and from the lower compartment is forced forward through the tube F, into the columns of the frame work by the second action of the pump in the descent of the plunger B, from whence it passes into the condensor.

It is obvious, that the order of the pumps may be reversed, that is, instead of the water being discharged from the well into the upper compartment of the cistern, it may be delivered into the lower compartment and filtered upwards.

In situations where it may be necessary to employ a governor, the following contrivance is adopted for cutting off the steam at an earlier or later period of the stroke as may be required. In fig. 10, the ordinary construction of governor for regulating the throttle valve, will be seen at G, having a sliding tube H, upon and feathered to the perpendicular shaft *m*, extending down towards the tappet wheel, where it is enlarged, to receive the collar appended to the adjustable tappet above described. From this collar there extends a small pin which acts in an oblique slot in the enlarged part of the tube H, and when by the centrifugal force of the balls the tube H, is drawn up, the oblique slot through the medium of the pin, causes the adjustable tappet to be shifed from its relative position to the other tappet, and to follow it sooner in its rotation, thereby cutting off the steam at an earlier period of the stroke.

In order to enable the engine to work the slides by hand, it is necessary to withdraw the clutch I, from the star wheel; this is done by pressing the foot upon the lever K, which holds up the clutch by a garter and spring;

the shaft *n*, can then be turned round, which moves the slide valves and effects the eduction and induction.

In high-pressure steam engines, it is proposed to employ the same constructions and arrangement of the parts as already described, dispensing of course with such appendages as are required for effecting condensation, and allowing the steam to pass direct from the jacket through a hot water cistern to the open air. In high-pressure condensing engines, it is necessary to let nearly all the steam which is above the pressure of the atmosphere escape, until it descends to the point of the pressure commonly used in condensing engines: this is effected by a peculiar arrangement of valves, which will be fully understood by reference to Plate VII. figs. 12 and 13: *a*, is the eduction passage; *b*, the passage open to the air; *c*, the passage to the eduction condensor. In these passages are placed the valves *d* and *e*, which are connected together by a link and joints *f*. Steam entering from the cylinder by the eduction passage, will exert its force against the upper valve *d*, which is much larger than the lower one *e*, and consequently *d*, will be thrown open, at the same time the lower valve closing, all the steam above the pressure of the atmosphere will escape by the passage *b*; but on the pressure of the atmosphere and the steam becoming nearly equalized, the valve *d*, will fall and close by its gravity, the connecting link opening the lower valve *e*, where the remaining part of the steam will be free to pass off by the passage *c*, to the condensor, when it may be acted upon by the jet of water in the usual way.

The improvement in the construction and arrangement of the paddles or wheels for propelling ships, boats, and other vessels consists in the following combination: two wheels are employed, having a series of bent paddles revolving

upon a common axle, but in opposite directions.— These wheels are surrounded each by a cylindrical rim to which the peripheries of the paddles are attached. Fig. 14, is a front view of one of the paddle wheels, with the cylindrical rim *a, a, a,* surrounding it; fig. 15, is a longitudinal representation of the two paddle wheels, the rims being cut in section perpendicularly through their diameters, for the purpose of shewing the construction of the wheels within.

It is proposed sometimes to employ the two wheels with bent paddles, as represented in the two last mentioned figures, revolving in opposite directions within a fixed cylinder.

It is necessary to observe, that the axis of the wheels is intended to be placed parallel to the keel of the vessel, and they may be driven by any of the ordinary modes of driving two wheels upon the same axle in opposite directions.

The improvements in boilers applicable to steam engines, consists, in the first place, in adapting a series of vessels arranged as shewn in the Plate. Fig. 16, is a front view, exhibiting the caps of the several vessels, and also the fire door, ash pit, and the several doors for clearing the flues; fig. 17, is a top view of the same, the roof and the casing being removed, in order to shew the three upper vessels, and the manner of uniting them together, that is, by bolting to flanges; fig. 18, is a horizontal section, taken through the centre of the lower vessels on a line with the furnace; fig. 19, is a vertical section, taken transversely through the series of vessels *a*, being the furnace; *b* 1, *b* 2, *b* 3, *b* 4, *b* 5, *b* 6, and *b* 7, the several vessels occupied with water and steam; and *c* 1, *c* 2, *c* 3, flues leading from the furnace to the chimney; fig. 20, is a section of the boiler taken through the front

parallel to its plane, shewing the passages of communication *d, d, d,* for water and steam, from one vessel to another. These connecting passages lead through the flanges *e, e, e,* surrounding the ends of the vessels as abovesaid, the passages as well as the flanges being cast with the front plate *f, f, f,* seen in figs. 17 and 18.

The water is introduced into the boiler at the lower part of the two upper side vessels *b* 5, and *b* 6, through feed pipe *g*, from whence it flows by the side passages *d, d,* into the vessels *b* 1, and *b* 2, and from thence upwards through the oblique passages *d, d,* to the vessels *b* 3, and *b* 4. The height of the water in the vessels *b* 3, *b* 4, will be regulated by a long cylindrical float *h*, acting on the wire, with a crank much in the usual way, which shuts off the supply of water when it has risen to the proper level.

It will now be obvious, that the steam generated in the vessels containing water, will pass through the several passages to the upper vessel *b* 7, and from thence through the steam pipe to the engine; and it will be perceived by the section, fig. 19, that the spaces between the several vessels are divided into longitudinal compartments, which constitute flues.

The flame and heated vapour of the furnace on reaching the further end divides, and passing under the lower side vessels *b* 1, and *b* 2, returns to the flues *c* 1, and *c* 2, formed under each; then rising upwards, it surrounds the necks of the vessels, and proceeds into the flues *c* 3, *c* 4, under the vessels *b* 5, and *b* 6, and ultimately escapes into the chimney.

These vessels and flues are enclosed by a casing of thin sheet iron, which is lined with a stratum of pulverized charcoal, or other imperfect conductor of heat, for the purpose of preventing its escape by radiation.

The Patentee says, I do not pretend to confine myself to the precise number of steam generating vessels shewn in the above, as the arrangement, exhibited at fig. 21, would be equally eligible when a larger capacity of boiler may be required.

The contrivance adapted to an apparatus for supplying the furnace with fuel, consists in a mode of projecting small quantities of coal into the furnace at different periods over the entire surface of the fire. Fig. 22, is a front view of a boiler, with the improved apparatus adapted thereto. Fig. 23, is the side view of the same, as it would appear at the right hand of fig. 22; and fig. 24, is the opposite side; fig. 25, being a vertical section taken in the same direction; *a*, is a hopper, containing coal broken into small pieces, the mouth of which is covered with a grating *b*, designed to prevent large pieces of coal being passed into the hopper; *c*, is a feeding roller, which, as it revolves, deposits small quantities of coal upon the shelf *d*; upon this shelf the pusher *e*, is intended to act, for the purpose of projecting the coal into the furnace; *f*, is a pinion shaft, which is to be driven by any convenient connexion to the engine; *g*, is the pinion at the end on the shaft *j*, which takes into and drives the wheel *h*, affixed to the feeding roller; *i*, *i*, are levers in the shaft *j*, which are connected by joints to the rods of the pushers *k*, *k*, is a bent lever fixed on the end of the shaft; *l*, *l*, is an excentric wheel on the pinion shaft; *m*, is a roller or pin projected from the side of the bent lever; *n*, is a heart wheel affixed to the end of the axis of the feeding roller.

Let it now be supposed, that motion is given to the pinion shaft *f*, and communicated to the feeding wheel *c*, coals will be deposited in small quantities on the shelf *d*. The pusher being drawn back by the excentric *b*, acting

against the pinion *m*, into the position shewn in the figures, it remains retained in that situation by the catch *o*, until the excentric has arrived at the position where it presents its shortest radius to the pin *m*; at this time a pin *p*, in the excentric raises the catch, and allows the spring *q*, to throw forward the pusher with considerable force, until its further progress is arrested by the toe of the bent lever *k*, striking against the heart wheel *n*, when the coals that had been deposited on the shelf, are thrown off on to the fire bars.

Now it will be seen, that the heart wheel as it revolves, will stand in various positions in relation to the toe of the bent lever, the force of the strokes will be also varied, and consequently, the coals projected to different distances, and distributed with considerable regularity over the whole area of the fire bars. By reference to figs. 22 and 24, it will be seen that the pinion above described, is held in gear with the wheel on the axis of the feeding wheel, by a pair of jointed bars *s*, *s*, the bearing of the shaft beiug held in a slot; the intention of which is to allow the pinion to be withdrawn for the purpose of stopping the feed of fuel, in case of the water in the boiler becoming by any means so low, as to render it unsafe to continue the fire under it. In order therefore to effect this object, a wire *u*, is brought from a float in the boiler, and attached to the arm of the lever *v*, and as the float descends, the lever *v*, is raised towards a vertical position, and ultimately falls over into the opposite enclined position, and by a pin at its lower extremity, the jointed levers *s*, *s*, are tripped, and thus, the pinion is drawn out of gear when the feeding of the fuel ceases.

An improved appendage to the safty valve is shewn by fig. 19, which consists in guiding the conical valve to its seat, without the intervention of the ordinary guide rod

and bridge, by means of a weight suspended from a chain withinside the boiler, and a lever and counterweight on the outside of the cap which covers the valve, and secures it against the possibility of its being over-weighted.—[*Inrolled in the Rolls Chapel Office, April,* 1830.]

Specification drawn by Mr. Newton.

To JOHN AITCHISON, *of Clyde Buildings, in the city of Glasgow and county of Lanark, merchant, for certain improvements in the concentrating and evaporating of cane juice, solutions of sugar, and other fluids.*—[Sealed 15th September, 1829.]

THESE improvements in concentrating and evaporating of cane juice, solutions of sugar and other fluids, consist in the employment of an apparatus of a peculiar and novel construction, by means of which the process of evaporation is more conveniently and economically effected, and carbonization prevented, than by any other means heretofore used for that purpose.

The apparatus may be made of any dimension according to the quantity of liquors required to be evaporated, and may be slightly varied in form from that represented in Plate VII. without materially altering its effect.

Fig. 1, is a horizontal view of the apparatus, the covering being removed, in order to shew the construction of the parts within. Fig. 2, is a side elevation of the same, the cover being shewn in section. Fig. 3, is an end view of the apparatus, with the cover attached to it. Fig. 4, is a longitudinal section of the whole apparatus, taken through the middle, as it would appear when charged with the liquor and in operation; and fig. 5, is

a transverse section of the same: similar letters referring to corresponding parts in all the figures—*a, a, a, a,* is a square or oblong framing, or standard of iron or wood, supporting the pan *b, b,* which is proposed to be made of stout sheet copper, and in the form of the segment of a cylinder. On the outside of the pan there is another corresponding segment of a cylinder *c, c,* attached to the pan by flanges and rivets, or by other means, having steam-tight joints, which constitutes a jacket or casing; and by these means a space *d, d,* is formed for the reception of steam, for the purpose of heating the syrup or other fluids contained in the pan.

A hollow drum or cylinder *e, e, e,* suspended upon an axle, is mounted in plummer blocks, fixed on the rim of the standard or frame, and is made to revolve by means of toothed gear, as shewn in the end view, fig. 3, the cylinder dipping into the pan to within about two or three inches of the bottom. This drum is formed by two concentric cylinders of sheet copper, attached together by rings or flanges at the ends, which are riveted or soldered, so as to render the joints steam-tight, leaving a space between them of about two inches for a steam chamber. A small rib, or feather of thin copper, is attached to the inside of the external cylinder, winding round it in a helical curve, for the purpose of conducting any water which may form within the chamber by the condensation of steam, and a receptacle or cup is placed at the end of the channel, for the purpose of receiving the water, and conducting it through the hollow arm into the axle, from whence it flows away by the bent pipe.

Steam from an ordinary boiler, situate at any convenient distance, is made to enter the apparatus through the hollow axle at the stuffing box *f,* (as will be best seen at fig. 4), and having reached the box *g,* proceeds

through one of the hollow arms *h*, into the space or chamber of the double cylinder; from thence the steam passes off by the hollow arm *i*, to the box *k*, and through the bent pipe *l*, to the space or chamber below, formed between the pan *b*, and its jacket *c*, for the purpose of heating the pan as above described: and ultimately the steam escapes with the air and condensed water by an open cock *m*, at bottom. The cane juice, syrup, or other fluids intended to be evaporated, having been first properly prepared and clarified, is to be introduced into the pan *b*, *b*, filling the pan to within three or four inches of the rim, which will cause about three-eighths of the diameter of the drum to be immersed in the fluid. The apparatus is now ready to be put in operation by introducing the steam as above described, and by giving to the drum rotatory motion from any first mover or by manual power. In order to keep the surfaces of the pan and of the drum free from incrustation, three scrapers are to be introduced, made of wood and covered with woollen cloth, which act in close contact with these surfaces, and scrape off the syrup or other fluids as they begin to thicken or concentrate.

The scraper intended to act against the bottom of the pan is shewn at *n*, in figs. 1 & 5, which is formed by a straight bar of wood extending along the bottom of the pan; its extremities are connected by joints to two crank rods *o*, *o*, which rods are attached to the crank shaft *p*, fig. 1. Hence as the winch *v*, is turned, the crank shaft revolves also by means of the toothed gear, and gives to the scraper the reciprocating action required, which agitates the thick parts of the material at bottom of the pan, and prevents it from adhering. The scraper intended to act against the external surface of the drum is a straight thin bar of wood *q*, figs. 1 and 5, supported by a pivot at

each end, bearing on blocks, which rest on the flange of the pan. These pivots are so placed, that the front edge of the wooden bar bears against the *periphery* of the drum, and the edge being bevelled, allows the syrup as it is scraped off to run over it and fall down into the pan.

The scraper, which acts against the internal surface of the drum, is a bar of wood *r*, extending along the drum in the inside, which is suspended by two arms from the central part of the axle of the drum, and falling by its own gravity, continues scraping the surface as the drum revolves under it. A cover or casing of wood *s*, *s*, is placed on the upper rim of the standard, and fitted close, for the purpose of enclosing the mouth of the pan and the drum, which casing has doors or flaps on the sides, in order to allow access to the interior. In the upper part of the cover at the end, an aperture is made leading to a ventilating box *t*, in which a revolving fan is mounted upon a horizontal axle, having a pulley at its extremity, for the purpose of driving it; and a very rapid rotatory motion is given to this fan by a band leading from a rigger, fixed upon the end of the crank shaft *p*, and passing over this pulley, as shewin in fig. 2. The syrup, or other fluid to be evaporated, having been introduced into the pan as before mentioned, and the steam admitted into the chambers of the drum, and the pan in the manner above explained, the flaps or doors of the cover are to be shut down close, in order to exclude the external air; the moving power is now to be applied by means of the winch *v*, or by any other convenient means through the train of toothed gear to the toothed wheel *u*, fixed on the axle of the drum on the outside of the frame work. Rotatory motion being by these means given to the drum, the hot syrup becomes agitated, and a thin stratum of the syrup attaching itself to the external and internal sur-

faces of the drum, it is carried round as the drum revolves, and the aquæous parts evaporated by the heat of the steam within, which operation is greatly assisted by the action of the rotatory fan in the box *t*. The fan is formed by four or more oblong blades affixed to radial arms extending from the horizontal axle, which blades fit closely to the interior of the ventilating box, and by the rapidity of their motion when driven, produce an exhaustion of the air within the box, which causes the vapour to rise rapidly from the surface of the drum, and from the liquor in the pan, and which is thrown out through an opening in the side of the box at *w*, by the centrifugal force of the fan. When the process of evaporation is finished, the syrup is drawn off through the valve *x*, at bottom of the fan, which is opened by raising the weighted lever *y*, from whence it is carried to coolers as usual. The Patentee concludes by saying, "though I have described in the performance of this, my improved process for evaporating and concentrating of cane juice, solutions of sugar and other fluids, only one rotatory drum partially immersed in the pan, yet I do not mean to confine myself to the employment of the particular construction of the apparatus set out in the drawing, as I contemplate, under some circumstances, when performing the operation of evaporation and concentration upon a large scale, to introduce two, three, or more revolving drums into one pan, their construction and mode of operating being the same as above described. And further, I sometimes construct my drum or rotatory cylinders with four, six, or more surfaces, by connecting several concentric cylinders, one within the other, and conducting the steam into their several chambers, by hollow arms leading from the central shaft, similar to those already described. And, lastly, I desire it to be understood, that my invention

of improvements in concentrating and evaporating cane juice, solutions of sugar and other fluids, consist in the employment of the means and apparatus above described. [*Inrolled in the Rolls Chapel Office, March*, 1830.]

Specification drawn by W. Newton.

To RICHARD IBOTSON, *of Poyle, in the parish of Stanwell, in the county of Middlesex, paper manufacturer, for his having found out an improvement or improvements in the method, or apparatus, for separating the knots from paper stuff, or pulp, used in the manufacture of paper.*—[Sealed 29th July, 1830.]

THIS invention consists in the peculiar construction of a sieve or strainer, which will be better understood by paper makers in general, who are acquainted with the difficulty hitherto existing in paper manufactories, of separating the knots which are frequently found in the stuff, or pulp of which the paper is made, from the pulp, previously to its being made into paper, by stating that when sieves or strainers made of wove wire, are tried for separating the knots from the paper stuff, the said sieves soon become stopped, and will not allow the pulp to pass through them; sieves of this kind are necessarily made of very fine wire, that is to say, there must be a great many wires or holes to the inch, and consequently the diameter of each individual wire must be a very small fraction of an inch.

Paper stuff, or pulp, consists of an assemblage of very fine flexible fibres of flax, hemp, cotton, &c. mixed with water, and in all cases, even in pulp, of which the finest paper is made, it will be found that the length of by far the

greatest number of the said fibres considerably exceeds the diameter of the wires, of which the said strainer is formed; consequently, the smallest of the wires and of the spaces between them, as compared with the length of the fibres, prevents many of the said fibres from flowing through the sieve along with the water.

Now, the principle of this invention is, that instead of making use of round wire, woven or otherwise, for the purpose of making a strainer, it is proposed to use a number of bars of brass, copper, or other fit material, of about half an inch in width, and of any convenient thickness, the upper side of each of which bars, as also the edges, are made as nearly straight, flat, and smooth as possible; and a number of such bars are fixed side by side to the bottom or underside of a wooden or metallic sieve frame of a rectangular shape, so that the upper surfaces or the flat sides of all the said bars may be in the same plane, that the edge of each bar may be parallel with the edge of the neighbouring bar, thereby leaving between every two bars a parallel slit, opening, or space of from about one-70th to about 100th part of an inch in width, less or more, according to the fineness or coarseness of the paper stuff or pulp to be strained. The only rule for determining the width of the said bars, with which the bottom of the said sieve or strainer is formed, is that the width, according to the experience of the Patentee, should equal or exceed the length of the longest fibres, which compose the paper stuff or pulp to be strained; the width of the said bars may therefore be varied at the discretion or convenience of the paper maker, or the maker of the sieve.

The sieve which the Patentee has in use, is employed to strain the paper stuff previously to its being made into paper by one of the machines known by the name of

Fourdrinier's patent paper machines, and the length of the sieve or strainer is such as suits the width of that individual machine; but the length of such sieves or strainers as are herein described, may be made to suit any paper machine, or to suit any vats, from which paper is made by hand.

The Patentee says, that although he shall mention the precise dimensions of the strainer, which he has made for his own use, he believes that these dimensions will admit of being varied, but to what extent, his experience as yet, does not warrant him in stating. The frame of the strainer is made of a rectangular shape, about five feet long, and eighteen inches wide, the sides and ends of which when of metal, are about four inches deep, and about half an inch thick. The metal preferred for this purpose, is that known by the name of gun metal. The lower edges of the sides, and ends of the said frame are to be made perfectly straight, and at right angles to each other; a number of bars are then prepared, of any suitable metal, but brass or gun metal is preferred of a length equal to the exterior width of the straining frame. The width of each of the bars being about half an inch, and the shape of a transverse section of one of the bars, would somewhat resemble the letter T, in which the metal forming the stroke at the top of the T, is about the eighth of an inch thick, and that of the upright stroke of about the same thickness, and about three quarters of an inch deep, so that each of the said bars are cast with a strengthening rib on the underside. For about one inch, or one inch and a quarter at each end of the bars, the rib is discontinued for the purpose of more conveniently forming holes through the ends, by which each bar may be fastened by screws to the bottom of the frame.

A sufficient number of the said bars having been prepared, and their upper surfaces and edges rendered as nearly straight and smooth as possible, they are to be made fast to the bottom of the sieve frame by screwing them to the sides of the frame with one or more screws at the ends of each of the bars, taking care that the opening or distance between every two bars shall be the same, or as nearly so as possible from end to end, and that all the openings between the bars from one end of the sieve to the other shall be as nearly as possible of the same width: the upper surfaces of the bars are made flat, in order to facilitate the removal of any knots or other matter collected in the strainer, and also because in that form the strainer is less liable to be choked up or clogged than if the bars were made of any other shape.

The strainer is to be placed in a horizontal position, or nearly so, in the top of the vat, so that when the vat is filled to the proper height with the paper, stuff, or pulp, the upper surface of the bars should be about one quarter of an inch above the surface of the fluid pulp in the vat, and the ribs on the under side of the bars dip into or be partly immersed in the pulp. One side of the strainer is to be supported by pivots fixed to each end of the frame, each pivot resting upon bearing pieces attached to the inside of the vat, the pivots having their axes in the same straight line, and parallel to the side and bottom of the strainer.

One side of the strainer is supported in this manner, in order that the other side may be raised or lowered so as to give motion to the strainer similar to the motion of the lid of a box or chest when moved upon its hinges. When the strainer is at work, it is to receive a quick up and down or jogging motion, similar to the motion given to the

well known machines employed in corn mills, commonly called jumpers or joggling screens, and this is to be effected by any of the well known means, such as cranks or cam wheels, which are usually employed by producing alternating motions. The Patentee proposes to employ two wheels, with three cams upon each: these wheels are to be about four inches in diameter and one inch in width, fixed or hung on an iron spindle or axle. The axle is to be placed horizontally, and made to turn in bearings fixed to the front of the vat in which the strainer works, the axle being on the outside and a little above the front side of the vat parallel to it. To each end of the sieve, a bar or arm of wood or metal must be attached, and extend as far as the spindle or axle on the outside of the vat, which arms are to be of such a shape as that their outer end may lie upon the cam wheels before mentioned. When the spindle and wheels are made to revolve, the arms fixed to the end of the strainer will be raised by the cam wheels.

Rotary motion is to be given to the spindle and cams, by cog wheels or otherwise, so that they shall make about sixty revolutions in a minute, or by other arrangements, the strainer may be made to jump or jog about one hundred and eighty times in a minute, and to cause the moveable side of the strainer to be lifted about one eighth of an inch at every stroke.

The pulp to be strained through the sieve or strainer is brought from the stuff chest in the usual way, well known to paper makers, and falls into the vat at the opposite side to that occupied by the strainer; but in order that the said stuff and the water may be well mixed together by what in paper mills is commonly known by the name of a hog, the vat is to be divided into two compartments by a vertical partition, placed a few inches from the hinge side of the strainer, and the top of the partition

should be about an inch higher than the top of the strainer.

In the bottom of the compartment at the back of the vat a hog is to be worked in the usual way, and immediately over the axis of the said hog and parallel therewith, another vertical partition is placed, the lower edge of which is about an inch above the arms of the hog, so as to leave room enough for the hog to revolve below the lower edge of the partition. The upper edge of the partition is made to rise about three inches above the first mentioned partition. Thus a space is left between the back of the vat and the partition placed above the hog, and both the pulp and the water are made to run fast into this space, consequently, before the pulp and the water can make its way from the space between the back of the vat and the said partition into the next space between the partitions, the pulp must descend and pass through that part at the bottom of the vat occupied by the hog, where it undergoes the necessary agitation or mixing by the motion of the hog, and is by this means brought into a fit state to be strained.

To the upper edge (which is horizontal) of the said first-mentioned partition, a copper lip or spout is affixed, for the purpose of conveying the stuff as it flows up between the two partitions into the strainer in a regular and uniform thin stream, nearly as wide as the said strainer is long. The knots or other matter which from time to time accumulate on the bottom of the strainer when at work, are to be removed at intervals by a narrow hair brush, the length of which is a little less than the width of the strainer.

Although the whole of the bars have been described as fixed to the bottom of the straining frame in such a manner, as would occasion the spaces or openings

between them to be permanently of the same width; yet it has been found convenient to employ another mode of constructing a strainer, so as to allow of altering the width of the spaces between the bars to suit the various kinds of paper stuff which may require straining. For this purpose, the Patentee says he varies the form of the bars, that is to say, instead of making the sides of each bar parallel, he makes the upper surface or side of each of the said bars tapering, and one-half of the whole number of the bars required to form the bottom of the strainer of a length equal to the exterior width of the straining frame, which he calls the shorter or fixed bars, and the other half of the bars about five inches longer than the last-mentioned bars. The width of the upper surface of each of the shorter bars is half an inch at one end and one inch at the other, thus tapering about half an inch, the angle of the taper of the longer set of the bars exactly corresponding to the taper of the shorter bars.

By way of further illustration let it be supposed, that one of the larger bars to be laid between two of the shorter bars, so as that they lie close to each other, having their upper surfaces all in the same plane, and so as that the wider end of the longer bar lies between the narrower ends of the two shorter bars; if the wider end of the middle or longer bars be drawn back a little from the narrower ends of the shorter bars, it will be evident, that the middle bars will no longer completely occupy the space between the shorter bars, and that an opening will have been made between each side of the longer bar and the corresponding side of each of the shorter bars, which openings may be increased or diminished at pleasure by moving the middle or longer bar, by drawing it further out, or pushing it further in between the shorter bars. According to this plan, the shorter set of the bars are to be fixed to the

sides of the rectangular straining frame, so that the spaces between all of the bars shall be one inch at the narrow ends, and half an inch at the wider ends, and that one of the longer bars, when interposed between any two of the shorter bars, shall completely fill the space between. In this manner, a short bar and a long one are alternately placed across the straining frame throughout its whole length, with the wider ends of all the shorter bars nearest to the front side of the vat; and the wider ends of all the longer bars, on that side of the straining frame which is nearest to the back of the vat.

It will be understood that when the shorter bars have been fixed as described, and the longer bars have been made to occupy the intermediate spaces left between every consecutive pair of the shorter bars, the wider ends of all the longer bars will project beyond the narrower ends of the shorter bars about two inches towards the back of the vat, and that the smaller ends of the longer bars will extend beyond the wider ends of the said shorter bars, about three inches towards the front of the vat. It will also be evident, that in this situation of the longer and shorter bars relatively with each other, the edges of every two consecutive bars will be so closely in contact with each other, as to leave no opening or space between them, whilst the said bars are in the situation last mentioned. A strong rectangular bar of brass or gun metal, about one inch and a half wide, and half an inch thick, and of the same length as the straining frame, is to be laid upon the upper surfaces of the longer bars, and to this the wider ends of the longer bars are to be firmly fixed by screws or rivets; another similar bar is also to be fixed upon the narrower ends of the longer bars, so that all of the bars may be retained, and securely held in their proper places, and at the proper distance from each other.

From the foregoing description it will have been understood, that the whole of the longer bars having been securely fastened together, constitute a kind of frame or grating, which admits of being drawn or moved to a certain extent from the longer bars. If the grating or all of the longer bars, be moved together towards the back of the vat, their edges will not then be in contact with the edges of the shorter bars, and there will be a space between every two consecutive bars throughout the whole length of the strainer.

The moveable grating is supported and held up against the under side of the straining frame by any of the well known expedients, such as straps or brackets, &c. fastened to the straining frame, so that the grating may be allowed to slide backwards or forwards whenever it may be found necessary. Adjusting screws are applied at each end of the grating, or racks and pinions, with an axle or spindle lying parallel to the back of the straining frame, the teeth of the pinions taking into the teeth of two racks, both fixed upon the rectangular bar to which the wider ends of the longer bars are fastened, so that by turning the spindle and pinions, the grating or the whole of the longer bars are moved simultaneously backwards or forwards, and by it are increased or diminished the openings between the bars.

The Patentee concludes by saying, "I lastly declare that my invention consists in making the bottom of a sieve or strainer of a number of bars such as have herein-before been described, or having parallel spaces between every two of the said bars which are adjoining to each other, and in making the width of each bar, such, as that the said width shall be equal to, or exceed the length of the fibres composing the paper stuff or pulp to be strained; or in making the bottom of the said sieve or strainer,

from one or more sheets or plates of metal, by cutting slips through the said sheet or sheets, or plate or plates, so that the said slits may be in lieu of and answer the same purpose as the spaces herein before described, as being left between every two of the bars herein before mentioned; and in the application of sieves or strainers when so made to the separating of the knots from the stuff or pulp of which paper is made, in the manner herein before described—[*Inrolled in the Petty Bag Office, November,* 1830.

To ALEXANDER DANINOS, *of Leman Street, Goodman's Fields, in the county of Middlesex, for a certain invention for the manufacture of improved hats and bonnets, in imitation of Leghorn straw hats and bonnets, which invention was communicated to him by a foreigner residing abroad.*—[Sealed 5th February, 1829.]

THIS imitation of Leghorn straw plait, to be applied to the making of hats or bonnets, is to be produced by stiffening cloth, and afterwards embossing it with a pattern resembling the figure of the straw when plaited.

Twilled cotton is proposed to be employed, or linen, which is to be dyed, so as to resemble the colour of Leghorn straw. After dying, the cloth is to be carefully calendered, in order to render it perfectly smooth, and for the purpose of giving it an increased substance, it is to be dipped into a mucilaginous liquor, consisting of a solution of curd soap, with water, and spirits of wine.

About one ounce of soap is to be dissolved in one pint of hot water, and when it has become cool, a pint of alcohol is to be mixed with it. In this liquor, the cloth is to be immersed, and after having been dried (without

wringing, as it is required to be kept smooth), it is to be steeped in another liquor, consisting of a solution of five pennyweights of muriate of lime in one pint of water, with one pint of alcohol, in which liquor the cloth is to remain for about a quarter of an hour; and then, after having been well rinced in clean water, it is to be hung up to dry without wringing, as before.

The object of the second steeping is stated to be, for the purpose of allowing the muriate of lime to act chemically upon the alkali of the soap, by which the soap is left upon the cloth in a resinous state.

When the cloth so prepared, has been rendered dry, two or more thicknesses are to be attached together, by a cement made of isinglass and starch, and when the cement has become hard, the cloth is to be passed through rollers, or to be acted upon in a stamping press to receive its embossed pattern.

The way proposed to effect the embossing, is by engraving upon a brass plate, or upon the periphery of a metal roller, the pattern of the Leghorn straw plait, as it appears in its manufactured state. A plain roller of wood is then to be covered with card or pasteboard, and with very considerable pressure on its axle, passed over the engraved plate or roller, so as to obtain the impression of the engravings in relief. The cloth intended to be embossed is then to be submitted in the usual way to pressure, between the engraved surface and the back or pressing roller, by which operation the embossed pattern is given to the dyed and prepared cloth, and it has the perfect resemblance of Leghorn straw plait.

Pieces of the material having been prepared as described, it may be cut into suitable forms, and sewn together at the edges in the shapes of hats or bonnets.—[*Inrolled in the Inrolment Office, Aug.* 1829.]

To Henry Blundell, *of the town of Kingston-upon-Hull, in the county of York, merchant, for his having invented improvements in a machine for grinding or crushing seeds and other oleaginous substances, for the purpose of abstracting oil therefrom, and which machine, with certain improvements or alterations, is applicable to other useful purposes.*—[Sealed 6th Dec. 1830.]

In the present Series of this Journal, Vol. II. page 337, we described the invention of M. W. Pescatore, of Luxembourg, for which a Patent was granted to William Beneeke, of Deptford, under the title of "an invention of a machine for grinding or crushing seeds, and other oleaginous substances, for the purpose of extracting oil therefrom, dated 20th February, 1827;" which said patent having become the sole property of Henry Blundell, above described, the present Patent is intended as an improvement upon the former invention.

The operating parts of the mill consist of a conical recess formed in a metallic block, in which the frustum of a cone of metal works; the surfaces of both being indented with oblique grooves or teeth, which cut and press the seeds as they pass through, by which the oil and meal are separately discharged.

The present improvements consist in blunting or cutting off the extreme ends of the teeth, which extend diagonally along the two conical surfaces; the object of which appears to be, to allow of the forming of a row of other shaped teeth, both at the crown and at the base.

The indentations of the teeth at the crown, are to be straight in the direction of the axle, partly formed on the cone and partly on a small cylindrical elongation of the cone; the teeth at the base are oblique, approaching to

tangents, which are formed upon a narrow plane, at right angles to the axis.

Had these alterations been all that the Patentee proposed to make on the original mill of Beneeke, we should have understood in what particulars the present invention consisted, though the advantage would have been still problematical: but the specification goes on to describe—dispensing with the teeth at the crown altogether, and also making the row of small diagonal teeth at the base in the same place as the surface of the cone; we are therefore at a loss to understand on what the Patentee grounds his claim of invention, although in conclusion he has set out under the following heads the points to which our attention is to be directed—(viz.) 1st, blunting or cutting off the ends of the main teeth;—2nd, dispensing with teeth at the crown;—3rd, placing diagonal teeth at the base; and 4th, the adaptation of the plates and runner as described to mills—[*Inrolled in the Inrolment Office, June,* 1831.]

Polytechnic Intelligence.

Royal Navy School.—A noble subscription has been begun for the erection and maintenance of a school to educate the children of our British seamen. It is to be hoped, that a fund will be raised equal to the completion of so truly beneficent an undertaking, on a scale of sufficient magnitude, and with large endowments.

Progress of Literature.—By command of the Pacha of Egypt, a periodical journal either has been published in the isle of Candia, or is about to appear there. It is to be written in Turkish and Greek.

Earthquake.—Several earthquakes have been felt at Smyrna. *Le Globe* says, that on the 28th of March, a violent shock had very nearly destroyed that city.

Flour for Sheep.—M. Maitre, a great agriculturist and breeder of sheep, near Chatillon-sur-Seine, about a year ago conceived the idea, that not only the straw of corn, but the dried stalks of clover, lucerne, &c. might be ground into flour. His experiments have been crowned with complete success; and he has obtained a kind of flour, the quality of which is similar to that of bruised fodder. This aliment is a substitute for bran; and is an agreeable and substantial food for sheep and lambs, who seek it with avidity.

Geology of Algiers.—M. Elice Beaumont, in a letter addressed to the Academy of Paris, on the subject of M. Rozet's researches, asserts, that he never supposed that the mountains of the North of Africa, formed like the Pyrennees, a single chain of contemporaneous elevation. The most modern charts exhibit a variety of chains, crossing in various directions, as M. de Humboldt has proved to exist with regard to the central plains of Asia; and that there is no doubt, but that in the North of Africa, as in Europe, there has been several upraising of mountain chains, in different directions, and at different periods.

Mineralogical Survey of Scotland.—In a former number of our Journal we mentioned, that an enquiry had been instituted by a Committee of the House of Commons, on the application of certain sums of money voted for a mineralogical survey of Scotland. Professor Jameson has laid before the Wernerian Society, a copy of a return to an address of the House of Commons, from which it appears, that no part of the money had been granted to that Society, nor to the Edinburgh Museum; but that the whole sum, amounting to upwards of 7000*l.* had been paid to Dr. John Macculloch, of Woolwich, for the mineralogical survey of Scotland, never until now, it is said, heard of by men of science in that country. It was remarked, that it would be desirable for government to cause to be published forthwith the results of this expensive, and *only partial,* survey of Scotland.—*Lit. Gaz.*

Babylon.—Captain Mignan, who published an account of his visit to this city, has now paid it a second visit. Letters have been received from him from Bombay, by a gentleman in London, whom he informs, that he had brought for him, from Babylon, various curiosities, including a fine specimen of the *Attlah* tree (a kind of tamarisk). He mentions, that he would send these things by a ship, which has since arrived, and also a MS. on Kurdistan, which, he says, is quite ready for publication, and will make a large and very interesting volume.—*Literary Gazette.*

Antiquities.—Bronze medals have frequently been found on the two shores of the Bosphorus, inscribed with the name "Agrippia," and others with the name "Cæsarea." Antiquaries have hitherto ascribed the former to Agrippia, or Anthedon, a town of Judea; the latter to Cæsarea, of Bithynia, or to Trellis, of Lydia; which like so many other towns of Asia Minor, received the surname of Cæsarea. The journal of Odessa, however, announces the discovery, in February, 1830, near the town of Taman, of a Greek inscription, which by mentioning, "a monument consecrated to the memory of Adronicus, the son of Pappus, by the Archontes of Agrippia and Cæsarea," shews, that the names of Agrippia and Cæsarea belonged to the same place, probably an ancient town of the island of Taman; and very likely Phanagoria, which was situated in the neighbourhood of the modern town of Taman.

Connexion of Hard Water and Beer.—Hard water is found in many instances favourable to the manufacture of beer; the Barnstaple and Liverpool ales, which are considered excellent in quality, and some others, are brewed with hard water. The Derby malt, which is much used in Lancashire, is found to make better beer there than in Derbyshire; and it may be supposed, that the Lancashire water, which generally contains much carbonate and sulphate of lime, occasions the difference. The river Trent has long been famed for the excellence of the ale made from its water: Burton, Nottingham, and the other towns that lie upon it, being famous for their malt liquor all over England. The river Trent is well known to run over calcareous strata in its course. The same brewer, with the same malt, cannot produce such beer at any other part of the kingdom.

Direction of the Diluvial Waves in the Shetland Islands.—From an inspection of the mass of clay and transported boulders, which lie disposed over the Shetland Islands, Dr. Hibbert has given it as his opinion, that the great current which deluged the British islands, as well as some parts of the continent, had, in these islands, a north easterly origin, or a south westerly direction. Our notions of the geological deluge, as connected with the upraising of mountain chains, would lead us to a very different system of research, and a much more extended enquiry, than that which has been pursued by the learned author, in this otherwise curious generalization.

COURSE OF THE RIVER NIGER.

British courage and perseverance has at length, it appears, settled the grand geographical question as to the discharge of the waters of the Niger, which has puzzled geographers for ages. The Landers, who, some time back, were sent upon a journey of discovery in Africa, have, they say, proved that the River Niger empties itself int othe ocean at the Bight of Biafra, below Guinea. A letter from Mr. Fisher, surgeon of his Majesty's ship, Atholl, and well known to the world for his own interesting voyages and travels, announces the discovery as follows:—

"*His Majesty's Ship Atholl, at Sea,*
Bight of Biafra, Feb. 3d, 1831.

"I take the opportunity of writing you a few lines, by a vessel that we have just now met on her way to England. My object in writing in this hasty manner is to acquaint you, that the grand geographical problem respecting the termination of the Niger is at length solved.

"The Landers, after having reached Youri, embarked in a canoe on the Niger, or, as it is called there, the Quarra, and came down the stream until they reached the sea, in the Bight of Biafra. The branch by which they came to the coast is called the Nun or Brasse River, being the first river to the eastward of the Cape Formosa. On their way down the river, they were attacked by the Hibboos (a fierce nation that inhabit its banks) and made prisoners or rather captives; but the King of Brasse happening to be in that country buying slaves, got them released by giving the price of six slaves for each of them. In the scuffle that ensued at the time they were taken, one of them lost his journal.

Whilst at Youri, they got the prayer-book that belonged to Mr. Anderson, the brother-in-law and fellow-traveller of the celebrated Mungo Park. They were upwards of a month at Fernando Po, whence they embarked, about ten days ago, in an English merchant vessel, bound to Rio Janerio, on their way to England. From their taking that circuitous route, I am in hopes that this will reach you before they arrive, by which you will probably have it in your power to give the first news of this important discovery.

"I do not recollect of any thing else to acquaint you with that is worthy of notice; and even if I did, I have no time to mention it, as the boat by which I send this (to the vessel) is just this moment ordered away.

"I must therefore bid you adieu for the present; and believe me, dear Sir, your's, very sincerely."

Yours, &c.

T. Fisher.

The travellers have arrived in England, and their report is thought to be satisfactory, as they have unquestionably descended by one arm of a very large river, which runs from the interior of Africa to the ocean; and that this is really the great river Niger,

admits of but little doubt. It is, however, much to be regretted, that enterprising men like the Landers, should have been allowed to proceed upon any such expedition without first instructing them as to the means of determining their latitude and longitude with tolerable accuracy; for, of this important part of science, it appears they are totally ignorant. We shall probably, in our next, be enabled to give a more detailed account of this discovery.

Novel Inventions.

A new mode of constructing Harbours. By William Matheson, Civil Engineer, of Edinburgh.

[Read before the Edinburgh Royal Society, 1831.]

The importance of good harbours to a mercantile country will be universally admitted, and the commercial eminence Great Britain has attained has naturally directed the attention of persons interested, in the extension of her trade, to the improvement of the surrounding harbours; and perhaps in no way has the skill and ingenuity of engineers been more extensively employed, or more usefully directed. Many great works have been executed at an enormous expense, and some of them have succeeded more or less, to the expectation of the parties.

The erection of works within tide mark must always be attended with trouble and additional expense, and it is the more to be lamented after such expensive operations have been carried into effect, that the whole benefit of them should be frustrated by some unforeseen circumstance, which has too frequently happened in such operations.

Of these latent difficulties, none has had a more powerful influence than the tendency of the tide, or the motion of the waters in particular situations, to silt or sand up

spaces which have been enclosed, and upon which, by means of such inclosures, a change has been made upon the currents.

This tendency to sand up is peculiar to every situation, where quantities of sand are under the influence of the tide, or the motion of the waters, and liable to be carried from place to place in mechanical combination with the water, either by means of the ebbing and flowing of the tide, or of the motion given to it by particular currents; or, by what is the most powerful of all, the motion given to it by the violence of the winds.

This motion of sand is generally in a direction opposite to that in which the wind is blowing, as may be seen in standing pools or lakes, where the sand, when the water is agitated by the wind, takes shelter under the banks of the weather side; but this will be more particularly explained afterwards.

In consequence of this tendency, the mouths of all rivers and flat shores, and all bays and estuaries into which the tide rushes with violence, are more or less subject to the accumulation and shifting of sand banks, if sand is to be found in such situations. Examples of this may be seen by examining the harbours of Aberdeen, Dundee, Dublin, and a variety of others; and it may be generally asserted, that no harbour was ever erected upon a river that was not more or less subject to the inconvenience of shifting sand banks at the mouth of the river, or of being itself sanded up.

The writer of these observations having been employed at an early period of life in works connected with harbours, his attention was particularly directed more than thirty years ago, to the annoyance met with by the sanding up of harbours; and he saw the object frustrated, after the most expensive works had been erected, in the hope that they would answer every purpose expected from them.

Never losing sight of the evil which he had observed, nor ever ceasing to feel a desire to have it removed, he at last by mere accident, discovered in the harbour of Pulteney Town, a circumstance which led him to a corrective theory upon the subject.

An opening had been left in the inner pier for upwards of a year, while the other operations of building were going on, and through which opening the receding tide, assisted by the land stream, passed into the harbour, and swept round, and again passed out at its mouth. By this action of the tide, the harbour was kept perfectly free from any tendency to sand up; but in the course of a very short period, after the works were finished, and this opening closed up, in completing the harbour, the sand accumulated in it to such a degree as to make it inaccessible to vessels of even very small tonnage, and to cause the outlay of a large sum of money in the erection of an outer harbour which it is probable will be visited with the like obstructions, if they have not already taken place.

The practical hint thus afforded induced the writer to form the idea of erecting the necessary works for sea harbours, with artificial openings, so constructed as to enable the waters still to retain their natural motion, and by that means to avoid eddies and stagnation, by the latter of which the sand and alluvian are deposited, and by the former of which the deposition is shifted and whirled from place to place.

His plan, therefore, may be very shortly described. Wherever it may be necessary to erect a harbour, or to extend the works of one in a situation where sand or alluvion may be likely to accumulate, he proposes, after laying a solid foundation of stone, to make the next range of building consist of a succession of arches of such a height of opening as not to disturb any class of vessels that may frequent the harbour, while they are protected and sheltered by the solid building erected over these arches, and at the same time the openings shall be so proportioned to the depth of water, at the different points of the building, as to allow the tide to pass freely through.

To enter into any detail as to the particular mode of constructing the works or of forming the arches, &c. is quite unnecessary here, as these must vary according to circumstances. It is enough, if it is admitted that walls with arches may be constructed under water, as well as solid walls; because so much being granted, it will appear sufficiently obvious that the motion of the tide, either in approaching or receding, will naturally pass through

these arches, and carry with it both in advancing and retiring, whatever is mechanically united with it, and the agitation kept up upon the bottom of the harbour will prevent the sand being deposited.

There is another mode already hinted at of sand being collected, which the peculiar construction of harbours here described is equally well calculated to counteract. It is a fact well known to some of those who attentively observe the operations of nature, that all floating substances, especially such as do not rise above the surface of the water, approach the shore with a land wind, and recede from it by a contrary wind. This seems to arise from the violence of the wind upon the water causing the surface water to pass from the shore, and the under water to approach it, to supply its place by means of an opposite current. This under current is the more conspicuous in its operation, when the tide flows or ebbs in a contrary direction to that of the wind, and the floating substances carried along are accordingly deposited.

The consequence is, that, wherever large solid buildings are erected in a current of water, which has a tendency to sand up, and where these buildings pass along the shore, the wind from the shore that passes over them causes a sand bank to be formed seaward of the building, and to bring it directly into the mouth of the harbour, if it happens to be in the line of that building. This fact is strongly exemplified by the sand already accumulated at the back of the wet docks at Leith, or the stone pier at Newhaven, and in many other situations.

New Patents Sealed, 1831.

To Joshua Proctor Westhead, of Manchester, manufacturer, for his having invented certain improvements in the manufacture of small wares.—Sealed 23d May, 6 months.

To Thomas Knowles, of Chalton Row, in the county of Lancaster, cotton spinner, for his having invented and brought to perfection certain improvements in certain ma-

chinery, by aid of which machinery, machines, commonly called mules, are or may be rendered what is termed self-acting, that is to say, certain improvements in certain machinery, by aid of which machinery, spinning machines, commonly called mules, are or may be worked by power without requiring the usual application of strength of the spinners to give motion to the handles or wheels, and to such other parts of mules as are commonly worked by the strength of the spinners.—23d May, 6 months.

To George Barnard, of Bristol, builder, for his invention of certain improvements in locks, and other spring fastenings for doors and other places.—23d May, 6 months.

To Thomas Westrup and William Gibbins, both of Bromley, in the county of Middlesex, gentlemen, for their invention of improvements in converting salt or other water into pure or fresh water.—24th May, 6 months.

To Richard Wood, of New York, in the United States of America, now residing in Bishopsgate Street Without, in the city of London (being one of the people called Quakers) for his having invented an inking apparatus to to be used with certain descriptions of printing-presses. —24th May, 4 months.

To Samuel Hobday, of Birmingham, in the county of Warwick, steel snuffer and toy manufacturer, for his having found out and invented a certain improvement in a machine to be worked by steam, that may be applied for the moving of ships, boats, and barges on the water, and to carriages, either on the roads or tram ways, and in a fixed position, may be applied to all the purposes that steam engines are now used for.—24th May, 6 months.

To Richard Fell, of Fountain Yard, Vauxhall Bridge Road, in the county of Middlesex, plumber, for his

having invented improvements in machinery or apparatus for raising water, and in the application thereof to certain useful purposes.—24th May, 6 months.

To Nicolas Hegesippe Manicler, of Union Road, Southwark, in the county of Surrey, chemist, and James Collier, of Canal Grove, New Peckham, in the county of Kent, civil engineer, for their having invented a new manufacture of useful products from a certain oleagenous substance.—31st May, 6 months.

To Samuel Lambert, of Regent Street, in the parish of Saint James, Westminster, in the county of Middlesex, gold laceman, in consequence of his having received a communication from a certain person residing out of our dominions, by which he is become possessed of the knowledge of an invention, being an improvement in throstle spindles, for spinning and twisting silk, cotton, wool, flax and other fibrous substances.—2d June, 4 months.

To Thomas Spinney, of Cheltenham, in the county of Gloucester, gas engineer, for his having invented or discovered certain improvements in apparatus for manufacturing gas for illuminations.—4th June, 2 months.

To John Pearse, of Tavistock, in the county of Devon, ironmonger, for his having invented certain improvements on wheeled carriages, and on apparatus to be used therewith.—7th June, 6 months.

To Edward Newman Fourdrinier, of Hanley, in the parish of Stoke-upon-Trent, in the county of Stafford, paper maker, for his having invented a certain machine for an improved mode of cutting paper.—20th June, 6 months.

To John Lee Stevens, auctioneer, and Peter Waycott, clock and watchmaker, both of Plymouth, in the county of Devon, for their having invented certain improvements in mangles.—22d June, 6 months.

CELESTIAL PHENOMENA, for July, 1831.

D.	H.	M.	S.	
1	0	0	0	Clock before the ☉ 3 min. 18 sec.
2	11	40	0	☾ in □ last quarter
2	12	0	0	☿ in conj. with ζ in Taurus
3	10	0	0	☾ in conj. with ν in Pisces
4	14	0	0	☾ in conj. with μ in Ceti
5	14	0	0	♀ in conj. with α in Leo
6	5	0	0	☾ in conj. with γ in Taurus
6	11	0	0	☾ in conj. with α in Taurus
7	7	0	0	☿ in conj. with η in Gemini
7	13	0	0	♀ in conj. with ♄ long. 29 in Cancer ♀ lat. 1 19 N. ♄ lat. 1 32 N. diff. of lat. 13
8	6	0	0	☿ in conj. with μ in Gemini
8	6	0	0	☾ in conj. with ν in Gemini
9	1	47	0	Ecliptic conj. or ● new moon
10	0	0	0	Clock before the ☉ 4 min. 52 sec.
11	18	0	0	♀ in conj. with ρ in Leo
12	2	0	0	☽ in conj. with ♄ long. 29½ in Cancer, ☽ lat. 41 N. ♄ lat. 1 31 N. diff. of lat. 50
12	10	0	0	☽ in conj. with ♀ long. 4 in in Leo, ☽ lat. 1' 5 N. ♀ lat. 57 N. diff. of lat. 8
14	15	0	0	♀ in conj. with δ in Gemini
14	23	0	0	☽ in conj. with 1 γ in Virgo
16	6	3	0	☽ in □ first quarter
18	16	0	0	☽ in conj. with γ in Libra
20	0	0	0	Clock before the ☉ 5 min. 57 sec.
23	3	0	0	☽ in conj. with d in Sagitt
23	4	28	0	☉ enters Leo
24	9	5	0	Eclip. oppon. or ○ full moon
25	21	0	0	☾ in conj. with ♃ long 20 in Cap. ☾ lat. 10 N. ♃ lat. 59' S. diff. of lat. 1' 9
26	14	0	0	♀ in conj. with τ in Leo
30	0	0	0	Clock before the ☉ 6 min. 6 sec.
30	16	0	0	☾ in conj. with ν in Pisces
31	13	0	0	☾ in conj. with 2 ξ in Ceti
31	17	41	0	☾ in □ last quarter

J. LEWTHWAITE

The waxing moon ☽.—the waning moon ☾

Meteorological Journal for May and June, 1831.

1831.	Thermo. Hig.	Thermo. Low	Barometer. High.	Barometer. Low.	Rain in inches.	1831.	Thermo. Hig.	Thermo. Low	Barometer. Hig.	Barometer. Low.	Rain in inches.
May 26	71	43	29,90	29,76		June 10	65	50	29,72	29,66	,15
27	68	41	Stat.	29,75		11	69	50	29,70	29,56	,1
28	68	46	29,93	29,84		12	75	51	29,83	29,70	,15
29	59	44	29,94	29,86		13	75	52	29,99	29,80	
30	65	45	29,86	29,84	,525	14	75	49	30,09	30,02	
31	63	42	29,92	29,85		15	73	49	29,85	29,84	
June						16	73	49	29,80	29,79	,05
1	67	43	29,90	29,86		17	70	48	29,90	29,86	
2	73	37	30,09	30,06		18	77	49	29,84	29,83	
3	73	38	30,11	30,10		19	73	53	29,96	29,86	,175
4	70	42	30,12	30,10		20	73	41	30,12	30,10	
5	73	42	30,09	30,10		21	76	44	30,14	30,12	
6	59	45	30,02	30,01	,3	22	73	46	30,15	30,13	
7	63	43	30,02	29,90		23	77	44	30,17	30,15	
8	68	40	Stat.	29,80		24	69	48	29,91	29,80	,05
9	73	41	29,80	29,79		25	64	46	29,78	29,63	

Edmonton. *Charles Henry Adams.*

THE

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No. XLI.

[SECOND SERIES.]

Recent Patents.

To John Wilks, *of Blue Anchor Road, Bermondsey, in the county of Surry, engineer, mill-wright & machinist, (one of the firm of Bryan, Donkin, and Company, of the same place, engineers, mill-wrights, & machinists,) for his having found out or invented an improvement or improvements in a part or parts of the apparatus for making paper by machinery.*—[Sealed 28th April, 1830.]

The subjects embraced under this Patent refer to that very ingenious and valuable machine for making paper in perpetual or indefinite lengths, which was invented about twenty-five years ago, by Mr. Henry Fourdrinier. The principal features of the present improvement are, 1st, a mode of expressing the water from the soft pulp as it passes from the vat upon the endless web, by means of a

hollow cylinder made with apertures like a sieve, and at the same time giving lines or ribs to the paper, in order to make it resemble what is called *laid* paper, made by hand moulds; and 2nd, a method of producing a vacuum within the said cylinder, for the purpose of drawing off the water from the pulp with greater rapidity, than it would be discharged in the operations of the ordinary machine.

The following is the substance of the Specification:—

"This invention consists in the application of a hollow cylinder, or roller of a peculiar construction in conjunction with other machinery now in common use, and well known in many of the paper manufactories in this kingdom, for the purpose of making paper. The cylinder or roller is to be made of copper, brass, or any other fit material, but copper is to be preferred. The length of the roller depends upon, and must be determined by the greatest width of any sheet of paper which can be made by the individual paper machine, to which the roller is intended to be applied; as, for instance, it is known to paper makers, that paper machines, such as are commonly called Fourdrinier's patent paper machines, are made of various widths; and consequently, the width of each machine limits the width of the sheet of paper to be made by that individual machine. But by way of example, let it be supposed, that one of the said rollers is required for a machine, which makes paper of the width of 54 inches. In such case, the roller is to be made of the length of 58 or 60 inches, so that its ends may extend over or beyond each edge of the sheet of paper upon which it is laid.

It is not very material as regards the effect to be produced, that the diameter of the roller should be made to any precise dimension, but it has been found that seven inches diameter answers very well.

"The present improved roller is to be made of drawn copper tube; such metal tubes are generally drawn upon cylindrical pieces of cast or wrought ironor steel called triblets, of any required length, turned and ground as truly cylindrical and as smooth as possible.

"In making the said roller, two triblets are to be employed, which on account of their size are proposed to be made of cast iron.

"The diameter of that one of the triblets which is first used, must be such as that its circumference may be equal to or rather exceed the length of the roller intended to be made, and the length of the said triblet ought to exceed by a few inches, the circumference of the other or second triblet upon which the tube for the roller is to be finished.

"It is necessary for us here to state that in making the said roller, triblets are employed in the double capacity of triblets for drawing the tube, and as mandrils, in which latter character they can be placed between the centres of a turning lathe, for the purpose hereinafter described.

"In making one of the said rollers of the length of 58 inches and its external diameter seven inches, I first make use of a triblet of 18¾ inches in diameter; and in the second place I use another triblet of 6 and 7-8th inches in diameter. The first sheet of copper of which I make my said roller is about 1-10th of an inch thick, and its length and breadth will be known with sufficient accuracy from what I have herein before mentioned, and by now stating that as in making my said roller the said sheet of copper is twice made into a tube, that is, it is drawn once on the first or larger of the hereinbefore mentioned triblets, and then again drawn upon the second or smaller of the said triblets, and in each of these operations of drawing I find, by experience, that the copper tube is lengthened or drawn out about 2½ inches.

"Thus it will be clearly understood that the sheet of copper of which my said roller is intended to be made, ought to be, in the first instance, long enough to form a tube, by having its ends hard soldered or brazed together in the usual manner, and to be then drawn upon the larger triblet, and that its breadth should be such, after making the proper allowances for waste at one end, which waste is unavoidable in the operation of drawing, and for the lengthening of the tube in drawing, as will make the length of the tube made by drawing it upon the larger of the said triblets rather more than equal to the circumference of the smaller one.

"Having in the manner hereinbefore described formed and drawn the said copper tube upon the larger triblet, I cause the said triblet with the said tube yet remaining upon it to be put into a turning lathe, and if on examination the surface of the copper tube be not then found truly cylindrical, I make it so by turning, filing, or grinding. This being effected, I proceed by turning to cut a number of grooves in the surface of the said tube throughout its length, making about eight grooves in every inch; the said grooves are one-sixteenth of an inch in width, and I cut them to the depth of half the thickness of the copper, and the said grooves are cut with a rectangularly shaped tool, so as to make the bottom of each groove parallel with the axis of the tube, and the sides of the said grooves at right angles with the said axis, consequently an annular space or rib of copper is left between every two of the said grooves, so as to form a succession of ribs and grooves throughout the whole length of the said tube.

"I find it to answer equally well in practice, if instead of making so many distinct grooves round the said tube, a continuous groove be cut in a manner similar to that employed in cutting screws by engines used for that purpose, so that the ribs between the grooves would

resemble the threads of a screw. In this manner, one or more such ribs or threads may be made for every revolution of the said tube like a double or treble-headed screw, but I prefer making it with a simple thread. After cutting the aforesaid grooves, I carefully smooth off the edges of the ribs or threads by a fine cut file or otherwise, so as to remove all such rough parts as would if allowed to remain cause the pulp or stuff of which paper is made to adhere to them and become injurious.

"Having proceeded so far, I in the next place, and in the usual manner, well known to tube drawers, remove or pull off the tube from the said larger triblet, and with a saw I cut the said tube open from end to end, through the part that was joined by brazing, and having softened the copper by the usual process of annealing it, I unbend it and reduce it again to a flat sheet.

"From the description hereinbefore given, it will be understood, that I must now have produced a sheet of copper, having one of its sides grooved or fluted throughout in the direction of its length. I now proceed to form the said sheet into another tube, and to draw it upon the second or smaller triblet, and in doing so I first carefully straighten both edges of the said sheet, making it at the same time of the proper width, and taking care that each edge shall terminate about the middle of one of the ribs and not in one of the grooves, so as that the edges which are to be united to each other by brazing or hard soldering, may be as thick as possible, which would not be the case if the edges terminated in the grooves where the copper is but half the thickness.

"In making the sheet of copper into a tube the said second time, I turn it up in the contrary direction, that is, its edges are brought together and not its ends as when it was first made into a tube, by which means the ribbed side of the

copper is now turned inwards, and the smooth side outwards; and the said ribs and grooves are now laid in the direction of the length of the said tube, and parallel or nearly so with its axis. Having drawn the said tube upon the smaller triblet, I place the said triblet together with the tube in a turning lathe, and in a similar manner to that by which I cut the grooves hereinbefore described, I proceed to cut similar grooves in the surface of the now smaller tube, with this difference, namely, that instead of eight in an inch, I now make 24, so that the width of each of the grooves, and of each rib is only the forty-eighth part of an inch. I do not, however, confine myself to any precise number of ribs in a given space, nor to any particular width, either of the said ribs or of the said grooves, as these must be left to the choice of the paper-maker by whom my said roller is intended to be employed.

"These last mentioned or second set of grooves I also make to the depth of half the thickness of the copper, or in other words, I cut them to such a depth as to make the grooves on the outside of the said tube meet those which are in the inner side, and from what I have hereinbefore said, namely, that the first mentioned set of grooves in the interior surface of the said copper tube, having been made to run in the longitudinal direction of the said tube, and that the second set of grooves have been cut in a transverse direction round the exterior surface of the said tube, it will be manifest that the two aforesaid sets of grooves will cross each other at right angles, or nearly so, and that if the operation has been properly performed, it will be found that where the grooves on the outside cross those in the inside, the whole susbtance of the copper has been removed, and that so many holes have been made, and in effect leaving a series of straight copper ribs on the interior surface of the said

tube, crossed by another series of ribs coiled round them on the outside, all securely and firmly united together, and forming a kind of cylindrical sieve.

"Before I remove the said tube, or put it off the triblet, I carefully round off, with a smooth cut file, the sharp and rough edges of all the ribs, making the exterior edge of every rib nearly semicircular, and as smooth as possible. At each end of the said tube, I leave an annular space of the copper of about three-quarters of an inch in width, without any grooves cut in the outer surface thereof, for the purpose of more securely fixing or attaching the said tube to two brass rings, which are hereinafter described. I now pull the said tube off the triblet, and in each end thereof I fix a brass ring with arms, and a central pivot there, so as to form it into a roller, the manner of doing which will be better understood by reference to Plate VIII, figs. 1 and 2; A, A, are portions of the ribbed copper tube (the manner of making which has been hereinbefore described) shewing the direction in which the two sets of ribs run. Fig 1, shews the exterior, and fig. 2, the interior surface of the said roller or tube *b*, *b*; and *b*, *b*, in these figures shew the plain part at each end of the said tube where it is fastened to the brass rings by rivets or screws; C, C, are the rings with arms and a centre piece in each, in which said centre piece is fixed the iron pivot or arbor B,; one such pivot is fixed by rivetting it in each of the said centre pieces of the said rings, as is shewn at *c*, in fig. 2, so that both the said pivots shall be concentric with the said rings, and have one common axis with each other, and with the said roller.

At *a*, and *a*, there is a groove turned in each of the pivots, for the purpose of suspending a weight by a hook thereon, in order to increase the pressure of the said roller upon the paper whenever it may be found convenient so to do.

"Fig. 3, is an end view of the said roller, in which is hewn the copper tube, and its internal ribs, as at A, A, the brass ring C, C, the arms D, D, D, D, the centre piece E, and the pivot B. Fig. 4, shews a section of the said ring, arms, centre piece, and pivot, so obviously as not to require further description.

"I will now proceed to describe the manner in which the said roller is applied to or employed upon a machine for making paper, and for the better illustration of which I have exhibited two sketches of the most prominent parts of a machine for making paper, the said machine being constructed upon the principle of those commonly called and known by the name of Fourdrinier's patent paper machines. Fig. 5, is a plan and fig. 6, an elevation or sectional view of the said machine, in which F, F, F, &c. is the cast iron frame of the said machine; G, G, is the vat; H, H, H, the first or wet press; I, I, I, the second or dry press rollers; the dotted circles J, J, shew the situation of the reels; K, K, is the breast roller; *c, c, c,* &c. are the small rollers for supporting the wire on which the paper is made; *d, d, d,* &c. the ruler bars, to which said ruler bars the shaking motion is communicated; *e, e,* one of the deckles; *f, f, f,* a deckle strap; *g, g, g,* are two short ruler bars, which do not partake of the shaking motion. To each of these bars I have fixed a small brass carriage, as shewn at *h, h,* in the plan, and *h,* in the section; the said two brass carriages are for the purpose of retaining and keeping my said roller in a proper position; the upper end of each of the said carriages *h, h,* is of a forked shape, and the pivots B, of the roller, are made to turn in the cleft of the forked carriages in such a manner that the roller may be prevented from having any lateral motion, but at the same time be allowed a free motion upwards and downwards, and so as that the whole of the weight of my

said roller may be borne by the endless web of wove wire upon which the paper is made.

My said roller is shewn at L, L, in which situation it lies upon the surface of the said web of wove wire. The relative situation of my said roller L, and the roller *b*, above which my said roller lies, is shewn in the figures, by which it will be seen, that the axis of my said roller L, lies a little on one of the axis of the roller *b*, that is, I place my said roller L, so as that its axis shall be about an inch more distant from the vat G, than the axis of the roller *b*. Hence it will be always understood, that whenever the said endless web of wire is put into motion, it will cause my said roller L, to revolve upon its surface; and that when any sheet of paper is made upon the surface of the said web, the said sheet of paper will pass together with the said web of wire below the surface of my said roller. And thus the said sheet of paper, which in this part of the operation is yet in a wet and pulpy state, becomes compressed by the weight of my said roller and freed of a considerable quantity of water, and the fibres of the pulp or stuff of which the said sheet of paper is composed are rendered more compact, and made to adhere more firmly together. And in this state the said sheet of paper is less liable to be injured on its passage between the first or wet press rollers H, H.

" The uses of my said roller, or the effects to be produced by it when made in the manner hereinbefore described, are not only to press out a portion of the water from and give to the said sheet of paper a greater degree of consistency, but it may occasionally be employed to give to the said sheet of paper somewhat the appearance of having been made upon a mould, such as is well known to paper makers by the appellation of a laid mould.

"I hereby further declare, that my said invention consists in the cylindrical part of my said roller, when the said cylindrical part is formed of a sheet of copper, brass, or other fit material, grooved on both sides in the manner hereinbefore described, and when in consequence of the said sheet of copper or other material having been so grooved, two sets or series of ribs have been produced or formed, crossing each other at right angles, or nearly so, leaving all the said ribs on one side of the said cylindrical part securely united to all the said ribs on the other side thereof by the natural cohesive force of the solid metal or material of which the said cylindrical part may have been made, and when the said grooves have been so made as to meet each other from both sides of the sheet of metal of which the said cylindrical part is composed, and thus causing perforations or holes to be made completely through the metal at all the intermediate spaces between the said ribs, where one set or series of the said ribs crosses the other. A similar effect may be produced by cutting grooves in a sheet of copper or other metal, previously to its being turned up into the shape of a cylinder or roller, so as to answer the purpose equally well; but in my opinion, the operation of making the said grooves is performed better and with more facility by the method hereinbefore described.

"And I further declare, that my invention also consists in the application of a roller or cylinder, having its cylindrical part made in the manner hereinbefore described, in conjunction with or in aid of any of the well known machines now in use for making paper.

"I sometimes employ two such rollers in the same paper machine, placing the second roller near to the first in the situation shewn by the dotted lines at *i, i, i,* in figs. 5 and 6.

" I now proceed to describe another application of my said invention in the construction of a hollow cylinder for the purpose of making paper, when the said cylinder is used in conjunction with or applied to one of the machines for making paper hereinbefore mentioned. In this case, the said cylinder is applied to the machine in the situation shewn at L, L, in fig. 7, which is an elevation, and fig. 8, is a plan of a paper machine, the principal parts of which are shewn in a similar manner, and marked with the same letters or figures of reference as those in figs. 5 and 6, the several figures are hereinafter referred to in order to explain the manner in which the said cylinder is constructed. In fig. 9, I have shewn two parts of the said cylinder, and also a portion of a round hollow axle, upon which the cylinder is made to turn. Fig. 10, is an end view of the cylinder, in which one of the brass rings, its arms, and centre piece or boss are shewn, as also a section of the aforesaid hollow iron axle. Fig. 11, is a longitudinal and sectional view of the cylinder, shewing the form of the hollow axle and other parts hereinafter described, and which parts are affixed to the hollow axle in the interior of the cylinder. This section is taken through the line K, K, in figs. 12 and 13, which are transverse sectional views of the said cylinder. Fig. 12, is a section taken on the line *l*, *l*, in fig. 11, and fig. 13, is a section on the line *m*, *m*, in fig. 11.

" I make the said cylinder of two copper tubes, an inner and an outer one; the internal diameter of the outermost tube must be made to correspond with the exterior diameter of the inner tube, so that when both the tubes have been finished in the manner hereinafter described, the outer one may be slipped over or upon the inner one, so that the said inner tube may form a lining to the outer tube. Previously to making the inner tube,

I cause the sheet of copper with which I intend to make the same, to be punched full of holes, as is shewn in fig, 9, a portion of the said perforated inner tube is shewn uncovered at K, K, K, as seen on the outside, and another portion of the said inner tube is shewn at L, L, where the inside of the tube is seen. In the same fig. 9, two portions of the outer tube also are shewn at M, M, and N, N; the former is an external, and the latter an internal view of the same. This figure also shews that the exterior or outer tube is grooved and ribbed in the same manner as the smaller tube hereinafter described; and I make the holes in the inner tube, the rows of which run in the direction of the length of the tube to correspond with the ribs or grooves on the inside of the aforesaid outer tube; and I make the holes in each of the said rows, so that every hole in one row shall be opposite to the middle of the space left between two holes in the next row, as will be evident on inspecting figs. 9, and 10. The distance from hole to hole in each row is the same as the distance between the rows.

"The diameter of each of the holes should somewhat exceed the width of each rib in the inside of the outer cylinder, and it is desirable, although difficult to accomplish, that every groove on the inside of the outer tube should fall immediately over a row of holes in the inner tube, for the purpose of admitting water to flow through both as freely as possible.

"Having punched the holes in the aforesaid sheet of copper, I form the same into a tube of the required dimensions in the usual manner practised by tube drawers, and having made the said inner and outer tubes in the manner hereinbefore described, I put the one over the other: and I find this operation is facilitated by pre-

viously cooling the inner tube as much as possible, and heating the outer one.

"At each end of the said tubes, I leave a plain part, as at N, N, and N, N, in fig. 9, in which said plain parts there are no holes in the inner tube, and grooves only on the inside of the outer tube. These plain parts are for the purpose of securely fixing the tubes or cylinder upon the brass ends of the said cylinder, one of which ends is shewn in fig. 10, in which O, O, is the brass ring, the outer edge of which is turned and made cylindrical, so as to fit tight into the inside of the end of the said tubes or cylinder.

"On the inside of each of the said brass rings are formed four pieces, projecting inwards towards the axis of the cylinder; the situation of which are shewn at *a, a, a, a,* in figure 10, and two of the said pieces are shewn at *a, a,* in section figure 9.

"In figs. 9 and 10, *b, b,* &c. is a brass ring, having four arms *c, c, c, c,* &c. and the boss or centre piece *d, d.* The outer edge of the last mentioned ring is also turned cylindrical, and of such a diameter as that the said ring shall correspond to, and fit the interior of the hereinbefore mentioned ring O, O; in this situation the said two rings are securely held together by four screws, which are shewn at *g, g, g, g,* in figure; and two of the said screws are represented by the dotted lines at *g, g,* in figure 9.

"In figure 12, *e, e,* shews a section of the hollow iron axle upon which the said cylinder is made to turn. The outside of the said axle is made truly cylindrical, so as to pass through, and fit the circular holes in the bosses or centre pieces *d, d,* of the said rings and arms at each end of the cylinder.

"Thus, it will be understood, that if the said hollow

axle be fixed, so as that it could not be turned, the said cylinder would be capable of having a rotary motion given to it, round the said axle by which it is supported; and when the said cylinder, with its hollow axle, is applied to the paper machine as before-mentioned, I fix the said hollow axle by means of two screw clamps, such as are shewn at *m*, in figure 7, and at *m*, *m*, in figure 8.

"To one end of the said cylinder, as at *p*, in fig. 14, I attach a cog or toothed wheel, by which means I am enabled to communicate a rotary motion to the cylinder, so as that the velocity of the external surface thereof shall be the same as that which is given to the web of wove wire, or as nearly so as practicable, that is, the velocity of the surface of the said cylinder over which the said web of wove wire is made to pass should correspond as nearly as possible to the velocity of the said web, otherwise a rubbing would be occasioned between the two, by which one or both would become worn or injured.

"As the means of communicating motion from one axle or wheel to another, so as to procure any required velocity in the one to be moved are so various, and so well understood, I need not give a particular description thereof, and it would be impossible to describe such means as would be applicable in every case.

"In figure 11, is a longitudinal and sectional view, and figs. 12 and 13, are, as is hereinbefore stated, two transverse sections of the said cylinder, intended to shew the form and relative situation of certain apparatus which is employed in the inside of the said cylinder.

"I will now state generally what is the effect to be produced by the said cylinder, when applied to one of the paper machines hereinbefore mentioned. It is well known to those who employ such machines as I have

hereinbefore mentioned, that the paper, stuff, or pulp is allowed to run from the vat G, (see fig. 7), from whence it flows on to the surface of the endless web of wove wire, whilst the said web is in motion. The lines o, o, o, &c. in fig. 7, shew the course in which the said web moves or circulates, and the small arrows near the lines point out the direction in which the web moves; and it is also known that the said web of wove wire operates as a sieve, and separates to a certain degree the pulp from the water with which it is previously mixed, that is, the water falls through the meshes of the web by its natural gravity, only leaving the pulp still in a very wet state, to be carried forward in the shape of a sheet of paper upon the surface of the web, until it arrives at the first pair of pressing rollers H, H, between which both the web and sheet of wet paper may be squeezed or pressed out. And it is likewise known, particularly in making thick paper, that the said paper is frequently injured on its passing between the first press rollers, by becoming water-galled. Now, the effect intended to be produced by the introduction of the said cylinder, is to cause the abstraction or discharge of a greater quantity of water from the sheet of paper than would be discharged by the gravitating tendency of the water only; and the expedient by which the said effect is produced, is the making of a partial vacuum on the lower side of the web of wove wire, whilst the wet sheet of paper lies on, so as to cause the weight of the atmospheric air to press the water from the paper and through the wire.

"By inspecting fig. 1, it will be understood that the upper part of the said revolving web of wire which is supported by the aforesaid small rollers *c, c, c,* &c. &c. lies or moves in a horizontal plane, or nearly so, until it arrives at the cylinder L, over the upper surface of which

a portion of the web is made to bend, and that the web, in passing from the cylinder towards the aforesaid first pair of pressing rollers H, H, moves in an inclined plane (the measure of the angle of inclination of the said plane, and how that is to be determined, will be hereinafter explained); I may here also state, that the said cylinder, together with its internal and other apparatus hereinafter described, constitute the means by which the hereinbefore mentioned partial vacuum is to be produced.

"In figs. 11, are shewn the apparatus which is applied in the interior of the said cylinder, by fixing or attaching the same to the before-mentioned hollow axle; *e, e,* in fig. 9, is a longitudinal view of the said axle, and *e, e,* in figs. 12 & 13, are transverse sections of the same taken upon the lines *l, l,* and *m, m,* in fig. 11, respectively; *a, a, a, a,* in fig. 11, and *a, a,* in figs. 12 and 13, are the cylinder, which has been explained as being formed of two tubes, one perforated, and the other grooved or ribbed in the manner described; *b, b, b, b,* in fig. 11, are the two ends of the said cylinder. For the sake of brevity, I have now called the before-mentioned rings *a,* and *b,* the arms; *c,* and the centre piece or boss *d,* in their compound character, the ends of the said cylinder.

"In order to prevent the cylinder from moving or shifting endways upon the hollow axle, I fix two metal collars upon the axle (as shewn at *p, p, p, p,* in figs. 9 and 11), so as that the said cylinder may be turned freely between them. In figs. 12 and 13, is shewn the section of a wooden trough, which I shall hereinafter call the vacuum trough (of which *d, d,* and *d,* are the slides, and *e, e,* the bottom). The ends of the said trough are shewn at *f, f,* in fig. 11, in which is also shewn the bottom *c, c.* To the bottom of the said trough I affix two cylindrical brass pins *g, g,* of about an inch in diameter, by making the upper end of each pin pass through the bottom of the said box,

and fastening the same by means of the screw nut, as shewn at *h, h,* in fig. 11, and at *h,* in fig. 13; and by inspecting the said figures, it will be seen that near the upper end of each of the pins there is a collar, as at *o, o,* and *o,* and that by means of the screw nuts, and the said collars, the pins may be securely fixed to the bottom of the trough.

"These two pins require to be about six inches and a half long, and the lower end of each is made to pass through the hollow axle in the manner and in the situation represented in the aforesaid figs. 11 and 13. The holes in the hollow axle through which the said pins pass, should be a little larger in diameter than the pins, so as to allow them to move freely therein in the direction of their length, but so as not to allow them to have too much lateral shake or motion, or more than is necessary for allowing the pins to move freely in the direction of their length.

"The hollow axle, when made of cast-iron, may have those parts thereof through which the said pins pass made of an appropriate shape, as shewn in figs. 11 and 13, which said parts I affix by screwing two small brass cups, as shewn at *j, j,* in fig. 11, and *j,* in fig. 13; in which last mentioned fig. 13, *j* is a section of one of the said cups. At the upper end of each of the cups there is a flanche, by which they are fastened with screws to the underside of the said hollow axle, as seen at *i, i,* and *i,* in figs. 11 and 13. By an inspection of the figures, it will be seen that the cups are so placed, as that they cover the lower ends of the pins.

In the bottom part of each of the said cups is a short helical spring; these springs must be of such a strength, or possess so much elastic force when under a state of compression, by having the said pins pushed down upon

them, that the said force should be equal to raising the whole weight of the vacuum trough, together with the pins and other apparatus connected therewith, so as to keep the upper edges of the said trough in close contact with the internal surface of the cylinder. The springs are shewn in the bottom of each of the said cups by the dotted lines at *j, j,* in fig. 11, and one of the said springs is shewn at *j,* in fig. 13; it will also be seen by the said figs. 11 and 13, that the upper part of the said trough, or the upper edges of the sides and ends thereof, is of a corresponding shape to that of the interior surface of the said cylinder.

" The upper edges of both the sides and ends of the trough are covered with leather. The edges of the wood are also covered by leather, drawn down on each side of the pieces of wood, and fastened thereto by small nails or tacks. The leather is thus applied for the purpose of bringing the edges of the sides and ends of the trough, of which the leather now forms a part, into close contact with the interior surface of the cylinder, and also for the purpose of giving to the edges of the sides and ends of the trough a smooth and soft surface, over which the internal surface of the cylinder may freely slide.

" Into the inside of the said trough, I introduce a copper pipe or tube as shewn at Q, Q, in fig. 11, and also in figs. 12 and 13, in which last mentioned two figs. Q, and Q, denote the place in the said trough occupied by the said tube. This tube has a number of small holes made in it throughout its whole length, and the ends thereof may be left open or may be partly closed. To the middle of the last mentioned tube, I join the end of another pipe or tube S, which is made to pass through a hole made for that purpose on one side of the said trough. It is then bent, as is shewn at S, S, in fig. 11, and made to

lie in a direction nearly parallel with the said hollow axle, till it reaches beyond one of the pins *g*, to T, where it is again bent, so as to pass through a hole made in one side of the hollow axle, and from the said hole it is conveyed along the inside of the hollow axle, and out at the end of the same, as is shewn in fig. 11.

" It is through these two last mentioned pipes or tubes that the air is intended to be drawn from the vacuum trough, and for this purpose the outer end of the pipe S, is connected with an air pump; and I prefer making the said air pump with three working barrels, in order to procure a greater uniformity in the state of the partial vacuum, or state of exhaustion, which it may be found necessary to produce in the vacuum trough.

" As the construction of air pumps, the manner of applying such pumps for similar purposes, and of giving motion to the same, are well understood by competent mechanics, I need not herein more particularly describe the same further, than by stating that the size of the pumps, and the number of strokes made thereby, should be such as to keep the state of the air in the vacuum trough of less expansive force than the external air, of about one pound to the square inch.

" It will be found that in making various kinds of paper, or in making the paper of different widths upon the said paper machines, that the said variation in the kinds and width of the paper will require a corresponding variation in the state of the partial vacuum, and that, consequently, some of the well known expedients must be resorted to, so as to enable the paper maker to increase or diminish the exhausting effect of the air pump at pleasure.

" In fig. 11, *m, m,* are two moveable partitions in the vacuum trough, which are made of the same shape as the

fixed ends of the trough, and to fit closely to the sides and bottom of the same. These two partitions are introduced for the purpose of limiting the extent of the partial vacuum to such a portion of the vacuum trough as lies or is included between them, and the length of the said portion will be determined by the width of the sheet of paper intended to be made (as will be well understood by paper makers), the distance between the said two partitions must be the same as that between the deckles of the paper machine, so as to place each of the said partitions opposite to the deckle on the same side of the paper machine *n, n.*

"In the last mentioned figure is a brass spindle, passing completely through the vacuum trough, and this spindle is made to turn in two round bearings, shewn at *f, f,* that is, each of the said bearings turns in a hole in the end of the trough through which it passes; and at one end of the spindle, as at *r,* there is a square part by which the spindle may occasionally be turned round to a certain extent.

"At *n, n,* each end of the spindle is formed into a screw; the one a right handed, and the other a left handed screw. A female screw is cut in each of the said partitions *m, m,* so as that the screwed part of the said spindle may turn in the said partitions respectively. Thus it will be understood, that by turning the said spindle in the proper direction, the said partitions may be brought near to or further from each other.

"At one end of the said vacuum trough is a hole V, made through the bottom, into which hole the end of the pipe T, is introduced; and this pipe is fastened to the trough by means of a flanche X. The said pipe is made to pass through the upper side of the axle into its hollow part, through which it passes beyond the end of the axle.

The outer end of the pipe is then bent downwards, as shewn at T, in fig. 12. This pipe is for the purpose of carrying off the water which is driven from the paper into the vacuum trough.

"In order to regulate the state of exhaustion in the trough, the outer end of the said pipe T, must be immersed in water, contained in any vessel most convenient for the purpose. Such a vessel is shewn at Y, in fig. 12. By this means the water will obviously be allowed to flow from the vacuum trough through the said pipe, and over the upper end of the said vessel Y, whilst at the same time the air will be prevented from entering the vacuum trough through the pipe T.

"In fig. 13, the line o, o_1 shews a portion of the hereinbefore mentioned web of wove wire, and the manner in which it is made to apply itself to a part of the surface of the aforesaid cylinder O 1, shews a part of the said web, which lies or moves in a horizontal plane, and O 2, shews that part of the said web which lies or moves in an inclined plane.

"From what has been hereinbefore said in describing the construction of the said vacuum trough, and the use to which it is applied, it will be clearly understood, that so much of the surface of the said cylinder as lies immediately over the said trough should be embraced or completely covered by the aforesaid web; hence it will be seen, that the width between the sides of the said vacuum trough determines the angles of inclination of the inclined plane, in which the said web must move after it has passed over the said cylinder, and also that the inside of one of the sides of the said vacuum trough must be in a vertical plane, as represented by the line 3, 4, in the said last mentioned figure.

"In fig. 7, immediately below the said cylinder is shewn the section of a wooden trough, which when in use is filled with water. Along one side of the said trough, I place a copper pipe, a section of which is shewn at *x*. The said pipe *x*, is of the same length as the cylinder, and lies parallel therewith. The distance between the cylinder and the pipe is about a quarter of an inch, and in that side of the pipe which is nearest the cylinder, there is a number of small holes in a line with each other. The said holes are made about one-tenth of an inch in diameter, and about six holes in every inch throughout the length of the pipe; or instead of these holes, a thin opening or slit may be made, which holes or slit are for the purpose of permitting a number of jets of water, or a thin stream of water to be projected or thrown against the surface of the said cylinder, and thus the said surface is continually washed during the operation of making paper".—[*Inrolled in the Petty Bag Office, October,* 1830.

Specification drawn by Mr. Donkin.

To WILLIAM CHURCH, *of Heywood House, Bordsley Green, in the county of Warwick, gentleman, for his invention of certain improvements in the construction of boats and other vessels, a part of which improvements are applicable to the construction of carriages.*—[Sealed 21st September, 1830.]

THESE improvements in the construction of boats and other vessels, and also in the construction of carriages, consist in substituting thin metallic plates peculiarly formed, as in the manner described below, in lieu of the

ordinary frame work and planking usually employed in building the hulls of vessels, the ojbect of which is to give greater strength and durability than is at present obtained, in constructing such vessels of wood, and at the same time the weight of the whole structure is greatly diminished. The form of the plates and the method of uniting them together, will be best understood by referring to the figures in Plate IX.

In order to give the requisite lateral strength to thin sheets of metal, it is proposed to furrow or otherwise corrugate them as shewn in figures 2, and 3; these furrowed sheets of metal are united together, to form the proposed vessels, by means of rivets or bolts, as shown in figure 4, where it will also be seen that some of the rivets or bolts *a, a, a,* which unite the edges of the furrowed sheets, pass through and connect plain sheets of metal *b, b, b,* to them on the outside, giving a smooth external surface. It may likewise be observed that the rivets pass through the bars *c, c, c,* which run across the ridges of the furrowed sheets on the inside, and thus confine the three parts, namely, the bars and the two metallic sheets firmly together. And here let it be observed that in uniting the edges of the several sheets of metal, great care must be taken to form perfectly air tight joints, which may be done in the ordinary way of making similar joints to steam boilers.

In the intermediate spaces between the joinings the plain outside sheets are to be connected to the ridges of the furrowed ones, and also to the bars before mentioned, by rivets or bolts, *d, d, d,* introduced at such distances asunder as the size of the vessel and the nature of the case may require.

Instead of the cross bars before described, it is proposed sometimes to apply plain sheets of metal *e, e, e,*

to the inside, similar to those on the outside, rivetting or otherwise confining the three thicknesses together in the manner before described, and under some circumstances thin planks of wood may be applied on the outside, in lieu of the plain sheets of metal, which it must be observed should always run in a direction across the furrows of the metallic sheets.

The interstices formed between the several parts of the side of the vessel should be carefully closed at top, to prevent the escape of air.

In fig. 4, it may be seen that in constructing the decks of vessels, two thicknesses of furrowed metallic plates are applied, crossing each other at right angles; this is done for the sake of greater lateral strength than could otherwise be obtained with the same quantity of metal. Sometimes the Patentee has recourse to the same means for strengthening the sides of vessels.

With a view to securing the masts firmly, and that they may not strain the thin metallic deck through which they pass, strong bands are to be rivetted or bolted to the deck, furnished with very broad flanches; the steps for the masts are made in a similar way.

In fig. 4, the metallic sheets are represented rivetted or bolted to the flanch of a metallic keel, which keel should be of a weight nearly sufficient to ballast the vessel. In the section of the vessel shown in this figure, the bulwarks are designed to be constructed of metallic tubes, which tubes are united together by socket joints, or they may be united by any other convenient means.

In conclusion, the Patentee says, "I claim as part of, and belonging to my said invention, the substitution of thin metallic plates or sheets formed into wavy, fluted, furrowed, or otherwise corrugated surfaces, in lieu of the ordinary materials employed in building the hulls of

vessels, and connecting the same together for the purpose of forming the hulls and decks of vessels, and also to plain sheets of metal, or planks of wood, as above described, by rivetting, bolting, seaming, soldering, or by any other convenient means in such way, as to enclose permanently portions of air in the interstices formed by the indentations or furrows of the metallic sheets or plates, and thus give greater buoyancy, duration, and strength to such parts of any vessel constructed with them than can be obtained from the use of timber or plates of metal of equal weight which have no interstices.

I further claim as part of, and belonging to my said invention, the use of the aforesaid fluted, furrowed, or otherwise corrugated sheets of metal, in constructing the bodies of carriages of various descriptions, and also in constructing other vessels not intended for floating, but which are subject to considerable lateral pressure, or where it is desirable to have a very thin metallic substance, such as distiller's and brewer's vessels, or where lightness or compactness is required, such as gas holders, water tanks for ships uses, &c.—[*Inrolled in the Rolls Chapel Office, March,* 1831.]

To JOHN LEVERS, *of New Radford, near the town of Nottingham, lace machine maker, for his invention of certain improvements in machinery for making lace, commonly called bobbin net.*—[Sealed 8th June, 1830.]

THESE improvements apply to that particular construction of machinery which is called or known by the name of the Lever's principle; and consists in a certain novel arrangement of mechanism, to be adapted to a Lever's machine, for the purpose of actuating some of the operative

parts of the machine, namely, the dividing of the bobbin carriages, and the taking up of the half meshes, by a rotary motion instead of the several movements heretobefore performed by the hands and feet of the lace-maker. These improvements are represented in Plate IX. at fig. 1, which exhibits an end view of a Lever's machine, partly in section, the standard or frame work being removed to shew the operative parts more clearly; *a*, is the warp roller, from whence the threads pass through the slay *b*, and guides *c*, to the work roll *d*; the carriages and bobbins *e, e*, slide in the combs, *f, f*, and are divided by the pusher bars *g, g*; the point bars *h, h*, are connected in the usual manner to the spindle bar *i, i*, the operations of which for making lace in this principle of machinery are well known to lace-makers.

"The improvements which form the subject of my present Patent, are designed to effect the required movements of the pusher bars *g, g*, for dividing the carriages, and the point bars *h, h*, for taking up the half meshes. Rotary motion being given to the actuating shaft *k*, by means of a crank or winch, the moving power is communicated through a train of wheels to the shaft *l*, but which train of wheels I do not claim as part of my invention. Upon this shaft I mount two sets of cams, *m, m*, and *n, n*; the cams *m*, being designed to work the taking up bars, and the cams *n*, the dividing bars; the levers or tail poles *o, o*, attached to the spindle bars for working the taking up bars in the ordinary construction of a Lever's machine, are in this improved construction elongated for the purpose of being connected to the vertical rods *p, p*; the lower extremities of these rods are attached to the vibrating levers *q, q*, which have their fulcrums in the shaft *r*, supported in a saddle piece upon the lower rail of the wood work. The reverse end of each of these levers

carries a friction roller, which is acted upon by the cam *m*, as the shaft *o*, revolves, and by that means the necessary movements of the point bars are effected; that is, the opposite surface of the cams *m*, acting against the ends of the levers *q*, *q*, alternately raise and depress each lever, and cause the point bars to take up the half meshes.

"The cams *n*, *n*, mounted upon the shaft *l*, as beforesaid, act upon friction rollers at the extremities of the other vibrating levers *s*, *s*, which also hang upon the fulcrum shaft *r*; the reverse ends of these levers are connected by the shorter vertical rods *t*, *t*, to other levers *n*, *n*, mounted in bearings *v*, *v*, on the top rail of the wood work, and friction rollers are attached to the opposite ends of these last mentioned levers, which act against the tail pieces *w*, *w*, of the dividing bars: thus by the rotary motion of the shaft *l*, and its cams *m*, and *n*, the dividing of the carriages and the taking up of the meshes is effected.

"The necessary movements of the other parts of the Lever's machine, may be obtained by any suitable arrangement of mechanism, to be actuated by the first moving shaft *k*, through the agency of the train of wheels shewn in the figure, or by any other contrivance calculated to effect the same object.

"In conclusion, I wish it to be understood, that though I have exhibited in the drawing, and described several parts of a Lever's machine, to which my improvements are connected, I do not intend in the present instance to claim any of the parts which have been heretofore known or or in use, but declare that my present improvements consist simply in the arrangement of mechanism above described for effecting the dividing of the bobbin carriages, and the taking up of the mesh when formed by the intervention

of the threads, which contrivances I believe to be perfectly new and never before employed or adapted to a lace machine, constructed upon the Lever's principle.—[*Inrolled in the Roll's Chapel Office, 8th December,* 1830.]

Specification drawn by Mr. Newton.

To Jacob Perkins, *of Fleet Street, in the city of London, engineer, for his invention of certain improvements in machinery for propelling steam vessels.* —[Sealed 2d July, 1829.]

These improvements consist in the peculiar arrangement, use, and application of the paddle wheels of vessels, and of the shafts or axles for carrying and moving the same. The shafts or axles are placed as nearly as may be in an horizontal plane, and are so inclined towards each other, and towards a perpendicular plane passing through the keel of the vessel, that if produced backwards, they would meet in such perpendicular plane, and form with it an angle of 45 degrees, and with each other an angle of 90 degrees, pointing towards the stern of the vessel. The shafts, or axles, being so inclined, pass obliquely forwards through the sides of the vessel, and the wheels being fixed with their planes at right angles to the shafts, stand obliquely forwards, and outwards, and as a consequence of that position of the axles inclined from the sides of the vessel at the places near which they are applied.

The floats, or paddles of the wheels, must be so set, or fixed, as that each of them shall stand at an angle of about 45 degrees to the plane of the wheel's motion, in order that each float, or paddle, when in the lowest part of its rotation, may make a right angle with the keel of the vessel, or act directly in the line of the vessel's way;

and the uppermost paddle be parallel to that way, or to the keel.

To effect these ends it will be necessary that all the paddles of the upper halves of both the wheels shall have their inner edges pointing backwards, or towards the stern of the vessel, and their outer, or extreme edges, in the direction of the vessel's way, or towards its head. The floats, or paddles, are fixed in the nave, or boss of the wheel, and radiate from its centre.

The practical effect of the above construction will be, that the paddles will enter and leave the water in an oblique direction, and that the lowest paddle will always move in the most advantageous manner for propelling, or backing the vessel, and the uppermost one be in the precise direction of the vessel's way, or parallel to the keel, and will meet with little impediment in its passage through the air, whilst the oblique position of the wheels, with reference to the side of the vessel, will give room for the water to escape.

The oblique position of the wheels will increase the width of way required for the vessel, but this inconvenience may be diminished, if not wholly removed, by making the paddles of less width than in common paddle wheels, and by letting parts of the wheels into hollows made for the purpose in the sides of the vessel.

Plate IX. fig. 5, represents the wheel in perspective, as it appears in direct action, when viewing the boat on the beam.

a, the lower paddle, presenting its edge only to the eye, as it then forms a right angle with the keel, and exerts its full action upon the water; *b*, the upper paddle, the whole face of which appears, as it stands parallel with the keel.

c, c, the intermediate paddles, the one about entering, and the other having emerged from the water.

Fig. 6, a bird's-eye view of the wheel, the letters corresponding with those of fig. 5.

Fig. 7, *d*, *d*, the wheels as fixed about the centre of motion of the vessel; *e*, bevelled wheels gearing into each other, and by which the paddle wheels may be driven.

The wheels may be placed in the bows.

A single wheel in the stern, or as fig. 6.

This last is to be considered as two distinct figures, and not as three wheels in one boat.

In the arrangement above described, the wheels may be much more deeply immersed in the water than in the ordinary arrangement of paddle wheels, which more than compensates for the loss of power occasioned by narrowing the paddles.

In letting the wheels into hollows in the sides of the vessel, the only thing to be attended to is, that the inner edges of the paddles at the lowest point of rotation, must not be within the line of the ship's side at this part, but must be without, and clear of the sides of the vessel.

This description applies to vessels and wheels for sea use, in which case the shafts and wheels, one on each side of the vessel, are placed so that a line joining the centres of the wheels would be in a perpendicular plane, passing through, or as nearly as may be through, or over, the centre of motion of the vessel, in order that the wheels may be removed from the water, or sunk into it as little as possible, by its pitching.

In river and coasting navigation, a single wheel may be used, formed as above, and fixed upon an oblique shaft passing out from the centre of the stern at an horizontal angle of about 45 degrees with the keel, the paddles being oblique, as above described, or placed at angles of about 45 degrees with the plane of the wheel's motion,

and in such manner that the lowest paddle may always move into a position at right angles with the keel, and, consequently, in that direction which will produce the most powerful action upon the water in the direction of the keel, either for propelling or backing the vessel, while the uppermost paddle will always be parallel to, or in a right line with the direction of the keel.

The Patentee says, the wheel may be made larger when placed in this position than in any other, and may extend so as to cover nearly the whole of the stern, and reach downwards nearly to the bottom of the keel. The position of the shafts or axles, and the construction of the wheels as above described, are such as I consider the most perfect; but a trifling variation from such position, if rendered necessary by circumstances, will not affect the principle or utility of my said invention.

I am aware that paddles placed obliquely, or at different angles to the plane of the wheel's motion, have been used, and I therefore lay no claim to them, except only so far as they are necessarily used in conjunction with my aforesaid oblique or angular shafts, or axles, at the two sides of any vessel as aforesaid, or with a single large wheel fixed astern; and I then only claim them when the said oblique paddles bend or incline in the direction before specified; that is to say, with that side of the lowest paddle at right angles, or directly opposed to the way of the vessel, or nearly so, and with the edge of the uppermost paddle in the direction of that way, or nearly so.

When the oblique shaft and large wheel are used at the stern as aforesaid, two rudders may be adopted, one on each side, or a single rudder at one side only.—[*Inrolled in the Inrolment Office, January,* 1830.]

To MATTHEW UZIELLI, *of Clifton Street, Finsbury Square, in the county of Middlesex, gentleman, in consequence of a communication made to him by a certain Foreigner residing abroad, for an invention of improvements in the preparation of certain metallic substances, and the application thereof to the sheathing of ships, and other purposes.*—[Sealed July 6th, 1830.

THE intention of the Patentee is to prepare metallic plates for the sheathing of ships, and covering of houses, by the employment of a certain alloy of copper and tin, which he considers will be less liable to oxydation, or to the effects of galvanism than the ordinary sheathing of copper in general use.

The alloy is to be prepared by melting together one hundred parts of pure copper with from five to seven parts of tin, which produces a compound metal that is less susceptible of being acted upon by the oxygen of the atmosphere than pure copper or brass, which contains a quantity of zinc.

After this alloy has been cast into plates of any convenient area, from half to three quarters of an inch in thickness, it is to be submitted to an annealing process in a furnace, by slowly increasing its temperature during a space of from two to three hours, until it has reached a dull red heat, and then cooling it again in the same gradual way.

When the annealing process is complete, that is on the plates becoming cold, they are to be subjected to the operation of a rolling press, or flatting mill, by passing them several times between the rollers under such a slight pressure as shall not cause the plates to expand more than about a quarter of an inch in a foot at each operation. After this rolling they are to be again annealed as before,

and when cooled rolled again, observing that the rolling should be each time in the same direction of the plate, in order that the grain of the metal may be laid smoothly and not disturbed. These operations are to be continued upon the plates for about twelve times, or until the metal on being broken seems to have lost its granulated appearance.

The annealing process may then be discontinued, and the rollers be made to act with power, for the purpose of elongating the plates in the proportion of about three inches in the foot, which rolling may be repeated as in a flatting mill, until the plates have acquired the thinness desired.

It is to be observed, that an increase in the proportionate quantity of the tin, would tend to make the alloy more brittle, and in that case, a greater length of time must be allowed for the heating and cooling in the annealling furnace; a less quantity of tin will make the alloy more ductile, but more subject to oxydation. If a small quantity of zinc should happen to be in the alloy, say about one per cent, it would render the metal subject to oxydation in a small degree, but would not be otherwise detrimental.—[*Inrolled in the Inrolment Office, January*, 1831.]

To Charles Hooper, *of Spring Gardens, in the parish of Marston Bigott, in the county of Somerset, shear grinder, for his having invented a new, valuable, useful, and improved machine for shearing and cropping woollen and other cloths.*—[Sealed 10th January, 1828.

In the manufacture of woollen cloths, after drawing out the ends of the fibres of the wool by means of the points

of teasles in the gig mill, or of wire cards or brushes, in order to produce the pile or nap on the face of the cloth, that pile or nap requires to be cropped or shorn down for the purpose of reducing it to a smooth surface.

In an early stage of the art this cropping used to be performed by large hand shears, and afterwards by similar shears, mounted in machines, and worked by means of mechanism; but latterly the operation has been performed by fixing one straight edge of thin steel plate, called the ledger blade, in a frame, in immediate contact with the face of the cloth, as it was drawn under it, and causing a spiral blade of steel to revolve with great rapidity against the edge of the ledger blade, forming angles with the edge, so as to produce the effect of a succession of small shears. These were, called rotary cutters, and several different constructions of machines, with such cutters, have been described in our preceding volumes. (See Vol. II. of the present Series, under the head Lewis and Davis's, and Gardner and Herbert's machines, page 258 and Plate IX.)

The present invention is a peculiarly constructed rotary cutter for shearing or cropping woollen cloths, consisting of a rotary frame holding a series of steel blades, which are placed in the form of a cone, the axle of the cone forming a considerable angle with the flat face of the ledger blade.

As the construction of an entirely new machine for shearing woollen cloth is not intended to be claimed by the Patentee, he has considered it only necessary to shew the new cutting apparatus, which is represented in Plate IX. at fig. 8; *a, a,* is the axle of the rotary cutters supported upon bearings *b, b,* which is driven by a pulley or rigger *c,* fixed at its end; *d, d, d,* are steel blades, mounted on bars, which are placed round the central axle

in the form of a cone, the bars being fixed to and supported by the outer disc *e*, and the inner discs *f*, *f*. The ledger blade *g*, *g*, is fixed to the frame *h*, *h*, of the machine by means of screws with proper adjustments, so as to allow of its edge being brought in exact coincidence with the edges of the rotary cutting blades *d*, *d*, *d*.

By the ordinary provisions of a shearing machine (upon which this frame and cutters are to be mounted) the cloth is made to pass in close contact with the edge of the ledger blade *g*, *g*, and then rapid rotary motion being given to the axle *a*, by means of a rigger or pulley *c*, the edges of the blades are made to act as shears, and to crop or cut the pile of the cloth as in other shearing machines. —[*Inrolled in the Inrolment Office, March*, 1828.]

To William Erskine Cochrane, *of Regent Street, in the county of Middlesex, Esq. for his new invented improvements in certain apparatus for cooking, and other purposes.*—[Sealed 15th January, 1828.]

The subjects of this Patent, are a portable oven, and a portable steam boiler, for cooking victuals: which are to be heated by the flame of a lamp. Plate IX, fig. 9, is a section of the boiler, taken vertically through its centre, in which *a*, *a*, *a*, are the passages for the flues; *b*, *b*, *b*, parts or chambers of the vessel occupied with water; *c*, is the lamp placed below, the burner of which is inserted into an opening in the bottom of the boiler, and the heat of the flame acting against the under surface of the central compartment of the water chamber, distributes itself through the flues, and causes the water to boil throughout the whole vessel. The steam thus generated, rises in the upper part of the boiler at *d*, *d*, and passes off by the pipe

e, for any heating purpose to which it may be desirable to apply it.

An aperture at *f,* is closed by a stopper, but which on being removed, admits air as a damper to the flues; the air for the support of the combustion of the oil being admitted through the tube of the argand burner, as in ordinary lamps, and the smoke is dicharged at the chimney *g.*

The boiler is furnished with a safety valve *h,* which is loaded with a weight, suited to the required pressure of the steam, and *i,* is the aperture at which the boiler is to be fed with water. There are also cocks on the side of the vessel, for the purpose of ascertaining the height of the water, and the force of the steam.

Fig. 10, is a section of a portable oven, consisting of a dish or pan *a,* with a close cover *b, b,* and a flue *c, c,* under the pan, into which the burner of a lamp *d,* is inserted, for the purpose of heating it. The cover has a damper to regulate the heat, and also an aperture by which access may be had to the interior.

One or several burners may be employed to the above apparatus; and the form and dimensions of the vessels may be varied at discretion, to suit particular circumstances; from which we conclude, that the only subject intended to be claimed is the employment of a lamp for the purpose of heating such an apparatus for cooking, the novelty of which we very much question, except in the precise form and arrangement of the particular apparatus shewn in the figures above referred to, as it must be well known that a lamp has been employed from time immemorial enclosed in a vessel for heating and cooking food, and other similar purposes.—[*Inrolled in the Inrolment Office, July,* 1828.]

To DAVID BENTLEY, *of Pendleton, in the county of Lancaster, bleacher, for his having invented or found out an improved method of bleaching and finishing linen, or cotton yarns, and goods.*—[Sealed 21st February, 1828.]

THE Patentee states, that in order to render evident the object and merits of this invention, it is necessary for him first to describe the ordinary course which is pursued in the process of bleaching linen and cotton goods.

Before the goods are introduced into the vats containing the bleaching liquor, they are usually twisted up into a loose sort of rope, and in that twisted form immersed in the liquor; the consequence of which is, that some of the parts between the folds are not properly acted upon by the bleaching liquor, and other parts of the folds prevent the free discharge of the liquor, which by the retention, produce stains that are much more difficult to remove, than the original colour before bleaching.

The intention therefore of the Patentee, is to extend the cotton or linen cloth out into broad sheets, and in that form to pass it through the bleaching liquor.

To effect this object the goods attached together, end to end, in considerable lengths, are first wound upon rollers, which rollers are placed in such convenient situations as will allow of the goods being drawn off in an extended form and conducted by endless cords, and a series of guide rollers, through several vats containing the bleaching and washing liquor.

An apparatus suited to this purpose may be constructed in various forms, therefore it is unnecessary to exhibit it in drawing. The end of the goods is to be attached to the guide cords, which cords being conducted up and down by pullies and rollers within the vats, the goods are

by that means immersed in the liquor, carried through it, and conducted out of the vat without manual assistance, and are by that means uniformly exposed to the action of the liquor.

In the progress through the apparatus, the goods are to be acted upon by squeezing rollers for the purpose of expressing the liquor, and when passed completely through, may be removed to other vats or boilers, and left immersed, if necessary, for any required length of time.

Yarns requiring to be bleached may be treated in the same way, by connecting the hanks one to the other, and conducting them through the vats containing the bleaching liquor in the way above described.

As the apparatus admits of so great a variety in its construction, the Patentee intends only to claim this particular mode of bleaching, washing, and finishing goods and yarns, by passing them in an extended form through the vessels by means of cords, or band and guide rollers, and pullies, as described.—[*Inrolled in the Inrolment Office, August*, 1828.]

AMERICAN PATENTS.

(*From the Franklin Journal.*)

For a machine for washing the wool on sheep, or for washing it after it is shorn off, or for washing hats out of the colour after dying; also for the purpose of washing clothing. Charles Harris, Snow Hill, Clinton county, Ohio.

To wash sheep, a box capable of holding water is prepared; within this box two flutter, or dash wheels, are made to revolve: between these wheels the sheep is to stand, with his head out at an opening in the box, provided for that purpose. An open wire screen, or grating, on each side

of the sheep, is to keep him from contact with the wheels. "The machine may be propelled by hand, by horse, steam, or water power. The water is thrown by the motion of the wheels on the sheep with such velocity, that the wool will be immediately washed perfectly clean.

In washing hats out of the colour, or clothing, a reel will be put between the grating, on which the article will be hung, that may require to be washed.

Thus endeth the specification, without any claim; but as we apprehend that this is the first machine of the kind used for this purpose, the whole may be considered as new.

For a machine for mortising and tenoning. Elisha Mudge, Brookville, Genesee county, New York.

The mortising machine is intended, principally, for the hubs of wheels, but it may be used for other purposes. A stout frame is made, on the sills of which there is a sliding piece hollowed out to contain the hub to be mortised, and having attached to it screws for confining the hub in its place, and a graduated circular gauge, for laying off the mortises. At the upper part of the frame is a crank for working the mortise chisel, and another for turning an auger to bore a hole in the hub, to allow the chisel to begin its work. The tenons of the spokes are formed by a notched chisel, which cuts a shoulder on each side, and which is worked up and down by a lever.

There is not any particular part designated as the invention of the patentee, but he has taken the machine as a whole, and, as such, claims it as new in the following terms: "I have never seen, heard, or read, of a like invention. I think I may claim this as exclusively my own, without fear of contradiction."

For a machine for flattening cylinder window glass. William Coffan, Junr. Hammonton, Gloucester county, New Jersey.

The present mode of flattening glass, is, by having two stationary stones, one in the flattening oven, on which the glass is flattened out from the cylinder form, and then is passed, by sliding over the surface of this stone, on the other stationary stone, which is in the annealing, or

cooling oven, through a small crevice under the partition wall which separates the two ovens, about half an inch above the surface of the two stones, which are joined together underneath this partition wall, and then the glass is raised up from the stone in the cooling oven, after sufficiently cooled, and stacked away.

This improvement consists in having a circular table, or wheel, with the stones for flattening and cooling placed upon both sides, on the top, or to cover the whole surface; and to carry the glass upon it when flattened, by revolving horizontally upon its centre, to the cooling, or annealing oven; to be supported and worked by proper machinery for that purpose, instead of having the two stones permanently fixed, one in each oven, and the glass shoved, or pushed, over the surface of the stones from the one in the flattening oven, to the other in the cooling oven.

The centre of this horizontal wheel, or table, is to be under the partition wall which divides the two ovens, at a distance above the top of the wheel, or table, sufficient to pass the glass under, so that the glass placed upon, and flattened on the stone, on the half of the wheel, or table, in the flattening oven, may be carried around upon this table which revolves on its centre, under the said wall, to the cooling oven, without taking it from the stone until it arrives in the cooling oven, and then, when sufficiently cool, to be placed away; at the time the wheel, or table, is stopped revolving, and the glass upon it is cooling and taken off in the cooling oven, after having been conveyed upon it, from the flattening oven, another cylinder can be flattened on the stone on the other half of the wheel, or table, that has passed by its revolution from the cooling to the flattening oven.

By this operation it does not require that the glass should be removed from the stone upon which it is flattened, which preserves the polish, and prevents the surface of the glass from being scratched, which is the case when it is pushed over the surface of the stones, from the one to the other. It also differs from the other mode, in this, that by the revolving of this wheel, or table, the stones are both made flattening, and both cooling stones, or the whole wheel, or table, is both a flattening and cooling stone.

For an improvement in the manufacture of Wheels, Pinions, or Movements, to be employed in the construction of Clocks, Time-pieces, or other machinery. Granted to John P. Bakewell, Pittsburgh, Alleghany county, Pennsylvania.

THE said improvement consists in making the said wheels, pinions, or movements, of GLASS, instead of the substances or materials which have been heretofore employed for that purpose. Which object may be obtained by forcibly compressing a proper quantity of melted glass between moulds or dies, in which an indentation, or cavity, has been made of the form and size which is intended to be given to the wheel, pinion, or movement, in such a manner that the said wheels, pinions, or movements, shall be formed with the requisite number of teeth, cogs, or leaves, and shall require little, if any dressing off, to fit them for use.

The holes by means of which the arbors, or axles, and the various springs, pins, &c. are intended to be attached to the said wheels, pinions, or movements, may either be made by corresponding cores, or piercers, of the required shape and size, placed within the moulds or dies, or they may be drilled through the said wheels, pinions, or movements, after the glass is cold.

It is to be observed, that in some cases it may be more economical and convenient to make the wheel and pinion in one piece, with a hole through the centre for the arbor or axis, which may be done by constructing the moulds, or dies, accordingly. And that the said, wheels, pinions, or movements, may either be used alone, or combined with others made of any of the material heretofore employed for that purpose.

As no claim is made to any particular construction of moulds, or dies, it is considered unnecessary to describe them minutely; but any person who has been accustomed to construct the moulds or dies which are used for the purpose of making glass plates, &c. by pressure, can readily construct such as would answer for making glass wheels; pinions, or movements. And as the relative size of the wheels, pinions, or movements, and the number of teeth, cogs, or wheels in each, must depend upon the judgment of the clockmaker or machinist, no specific size can be designated, and the claim is therefore for making wheels and pinions, or movements of glass, of

any size, and with any number of teeth, cogs, or leaves, and applying the same to the construction of clocks, timepieces, or other machinery, either alone, or combined with others made of any of the materials which have been heretofore employed for that purpose.

For an improvement in the method of Saccharifying Rye, and other kinds of grain; the sweet, and common potato, and other vegetable substances containing fecula. Granted to Amable J. Brasier, of the city of Philadelphia.

Into any convenient vessel, (which, however, must be made of materials on which diluted sulphuric acid cannot act injuriously,) I put one hundred parts of either of the above named substances, with from one to three hundred parts of water, acidulated with from two to four parts of sulphuric acid, I then bring the whole to the boiling point, which heat I maintain during the whole time of the operation. The heated water first converts the fecula contained in the substance employed into a mucilage, which is afterwards liquefied by the action of the acid, which, by keeping the liquid in a state of fluidity favours the saccharification.

When the substance employed is finely divided, the heated water acting upon the whole of the fecula at once, the quantity of mucilage formed, thickens the mass very much; I, therefore, when I use but little water, do not add the whole of the substance, but keep a part to add in portions when the mass is liquefied. I also usually agitate the mass to faciliate the liquefaction.

When the substance is not finely divided, the action of the heated water on the fecula being slower, the mucilage is partly liquefied as soon as formed, the mass not being thickened as in the first case, I add the whole of the substance at first; I also agitate it, in order to divide, or the better to crush it, as the action of the heat and acidulated water soften it.

I regulate the quantity of water to be used according to the state of concentration in which I wish to obtain the syrup, and if the heating is effected by introducing steam into the mass, a quantity of water equal to that formed by its condensation should be deducted from the original quantity.

The time required for the operation varies very much, as it depends upon the nature and state of the substances acted upon; the more compact and coarse it is, and the more sparingly the acid is used, the longer period will be required; even more than four days; while, on the contrary, it may be completed in less than six hours, if the acid is used profusely, and the substance acted upon is porous or subdivided; I only give the above as a guide, for I always ascertain its termination by the tincture of iodine no longer giving a blue or purple colour to the liquid, as is the case so long as any portion of the fecula remains unsaccharified.

I then neutralize the acid with lime, or a carbonate of lime, and separate, if required, by filtering, or any other means, the syrup from the sediment.

The syrup thus obtained may be afterwards evaporated, fermented, or applied in any way which may be found convenient.

Since I have made the above improvement, I have ascertained that the common potato had already been used for the above purpose, but it was first reduced to a pulp, and afterwards so treated as to require considerable labour; but I have discovered that the saccharification of the potato can be effected by exposing it whole to the combined action of heat, and of acidulated water. So far as the common potato is concerned, therefore, I limit my claim to saccharifying it without first reducing it to a pulp.

What I further claim as new, and as my invention and discovery, is the saccharification, by the combined action of heat, and water acidulated by sulphuric acid, of the fecula of the substances already referred to, without separating it from their other principles, by whatever variation of the within recited process the same may be effected.

An improvement in the stock and hand vice. Granted to Enoch D. M'Cord, of the village of Sandy Hill, in the county of Washington, New York.

In the vices which have been heretofore in common use, the washer between the head of the screw and the front stock, and that portion of the pipe box which comes in

contact with the back stock, have merely plane surfaces, at right angles with the axis of the screw, which press upon corresponding surfaces upon the two stocks. When the vice is closed, they are in perfect contact; when it is open they are not. When a common blacksmith's vice is opened four or five inches, no part of the washer touches the stock, but its upper edge; when, therefore, an attempt is made to secure any large body in it, it cannot be held as firmly as a small one, and the screw is in danger of being broken. To obviate this difficulty is one of the principal objects of the present improvement

To effect this, the washer to be used under the head of the screw, and the front end of the pipe box, I make in the form of a segment of a globe, perforated in the centre for the reception of the screw; a cavity to correspond is made in the outside of each stock, at the place through which the screw passes, and fitted so as acurately to receive one of these spherical segments, and thus form a segment of the ordinary ball and socket joint, which will adapt itself to any position of the jaws of the vice. They may then be pressed together with equal firmness, whether a large or a small body is between them, and the screw is not more liable to be broken in one case than in the other. As the stocks of vices in general have no lateral movement, it is apparent that a joint to answer all the purposes desired may be constructed in the form of any regular solid of revolution, or any segment thereof, made parallel to its axis, or coinciding with it; but a spherical segment not exceeding half a sphere, I prefer to any other shape, as the cavities can all be fitted with drills, and less of the substance of the stock will be removed in fitting. It is equally obvious that in constructing this joint, it is not material to have its concave portion upon the stock of the vice, as the principle and operation will be the same if the order be inverted, that is, the washer and pipe made concave, and the stocks convex.

As it is my intention to make most of these vices of cast iron, I have made another improvement, which is, however, equally applicable to cast iron or wrought It consists in making the face of the jaws of other and harder materials. A plate of steel with suitable teeth cut in it, is screwed to the inside of each jaw, the bottom resting on a shoulder in the stock; or the same plate may

be made to constitute the inner portion of a band, driven around the upper end of each stock. When it is wished to avoid the expense of steel jaws in the manufacturing of cast iron vices, the jaws may be chill hardened when they are cast.

APPENDIX

To the Report of the Select Committee of the House of Commons, on Patents.

Papers delivered in by John Farey, Esq.

[*British Law of Patents for Inventions.*]

(continued from p. 373.)

The King against Else. Proceedings to repeal Else's Patent of 1780, for a new manufacture of Lace, called Ground Lace. Tried in the King's Bench, after Michaelmas 1785, before Mr. Justice Buller. Verdict for the Crown.—East's Term Reports, XI. 108.

The specification claimed the making of lace, of silk and cotton thread mixed, without confining it to that particular mode of mixing them upon the frame, which constituted the merit of the invention. Lace had been previously made of silk and cotton mixed, though not successfully, or in the same way as the patentee practised. A patent for an invention, which is only an improvement, must not be extended to the whole of the old article, or the patent is void. Cited by Mr. Justice Park, on the trial Bovill *v.* Moore, in 1816—Davies, p. 144.

Turner against Winter. An Action for infringement of Turner's Patent of 1780, for a "method of producing a Yellow Colour for painting in Oil or Water; making White Lead; and separating Mineral Alkali from common Salt; all to be performed by one single process." Tried in the King's Bench at Westminster, before Mr. Justice Buller, and a verdict given for the Patentee. Motion was made, 5 Feb. 1787, to set this verdict aside.—Durnford and East's Term Reports, Vol. I. p. 602. Davis, p. 145.

The specification was very obscure; it directed lead to be calcined to a calx, and mixed with half its weight of sea salt, and a sufficient quantity of water to dissolve it; the mixture being ground fine, was then to stand until the lead changed to a good white, and the salt was decompounded; the alkali was then separated by water. The yellow colour was produced by calcining the lead, (after the alkali was thus separated) until it acquired the required colour, which would be of different tints, according to the degree of heat. The white lead was to be finished by repeated washing and bleaching. Some materials were enumerated, as minium, red lead, fossil salt, salt water, &c. which would not answer the purpose; and the white substance obtained was not what is commonly called white lead. Also the calcination required to be continued to fusion, but it was not so stated in the specification.

Mr. Justice Ashurst: " If there is any unnecessary ambiguity introduced into the specification, or any thing which tends to mislead the public, the patent is void. Here is a doubt upon the evidence, that unnecessary words have been added without any good view. The patent is for making white lead and two other things; if the process, as directed in the specification, does not produce that which the patent professes to do, it is void." And Mr. Justice Buller said, " If the novelty or effect of the invention be disputed, the patentee must show in what his invention consists, and that he produced the effect proposed in the patent in the manner specified. The evidence shows that the process is not accurately described in the specification; that it fails to produce white lead, and that the yellow colour alone is a valuable invention. If the patentee says, that by one process he can produce three things, and he fails in any one, the consideration of his merit, and for which the patent was granted, fails; and the Crown having been deceived in the grant, it is void."

Note.—No further proceedings are reported, but the patent appears to have been established, for in 1792 an Act was passed (32 Geo. III. c. 72,) to extend the term of the patent eleven years from that time. The preamble states that he " obtained one verdict," (a new trial having been granted.)—Davies, p. 134.

Bramah against Hardcastle. An action for infringement of Bramah's Patent of 1784, for a Water Closet. Tried Trinity Term 1789, in the King's Bench, before Lord Kenyon. Verdict for the Patentee.

The merit of the patent water closet was proved; but it was contended that the patent was taken for the whole water closet, when the invention was only an improvement on the water closets used before. Lord Kenyon; " In my opinion the cause mainly depends on this, whether the thing granted by the patent be entirely new; I admit one part is very ingenious and perfectly

new, but it is not claimed by the Patentee. Unlearned men look at the specification and suppose every thing new, that is there; if the whole be not new, it is hanging terrors over them. In a former machine there were parts in principle the same, obtaining the same effect, whether those means differ in shape or not, is not material; I think the patent void, those parts not being new." The jury, however, found for the plaintiff.—Papers delivered in by John Farey, Esq. 8 June, 1829.

Oldham against Langmead. An action brought by the Assignee of a Patentee, against the Patentee himself, for infringement, by practising his invention contrary to the assignment. Tried before Lord Kenyon after Trinity Term, 1789.—Dunford and East's Term Reports, III. 439.

Who would not permit the patentee to show that it was not a new invention, against his own deed; for after he had conveyed away his interest in the patent, he ought not to attempt to set up that he had no right to convey; he was estopped by his own deed from that defence.

Hayne and another against Maltby. An action on an agreement made with the Assignees of Taylor's Patent 1778, for a machine to be added to a stocking frame to make Point Net, or imitation of lace. Tried in the King's Bench, before Lord Kenyon, 17 Nov. 1789. Judgment for the Defendant.—Durnford and East's Term Reports, III. 438. Davies, p. 156.

The invention being the same as Morris's patent, 1764, and from other causes, the patent was admitted to be void. The case of Oldham *v*. Langmead was cited, to shew that the defendant by entering into the agreement, had acknowledged the patent right, and was estopped from pleading against it. Lord Kenyon: "This is a covenant to pay a certain sum, in consideration of the plaintiffs having conferred on defendant an interest in their patent, but now it appears that the patent is void, and yet plaintiffs insist on the agreement. The doctrine of estoppel is not applicable here; for the person supposed to be estopped, is the very person who has been cheated and imposed upon."

Mr. Justice Ashhurst: "In the case of landlord and tenant, as long as the tenant enjoys the estate, he shall not be permitted to deny his landlord's title, because he has a meritorious consideration; but where he expelled by another having a superior title, he may plead it. This patent was used by the plaintiffs in fraud. The only right conferred by the agreement, was that which defendant had before, without any grant from the plaintiffs."

Mr. Justice Buller: "The agreement supposes an exclusive right to the machine under the patent, and that the right could be conveyed; it is now discovered that there was no such right, and therefore the defendant has not the consideration for which he entered into the covenant. It is like the case of landlord and tenant, after eviction of the latter."

In the case of O'Reilly ex parte in Chancery, heard in 1790, the great seal was refused to a patent for representing Italian Operas, in a new house.

A warrant had been given for a patent for 31 years, to permit a new Italian Opera to be established, the old opera being stopped by the burning of the house in 1789. Caveats had been entered to prevent such patent being sealed, by claimants under the former patent, (of which 13½ years were unexpired) and others, creditors to the property of the patentees.

The Lord Chancellor Thurlow called upon O'Reilley not merely to answer the objections of the opponents, but also to make out a proper case for the patent, and what the purpose of it was: "All objections to it are open upon these caveats, and the propriety of the grant must be sustained in every particular, even if there had been no caveats against it. Nothing is required from those who oppose a patent, but to show that they have an interest. My office is to see that the King is not deceived, nor his object disappointed. This patent cannot be passed in its present form, for a patent must be taken under proper restraints; this seems to me to be calculated to create more lawsuits than I can form any idea of; and it is not convenient that such an institution (which the King may provide) should be followed by such consequences. There are considerations which do not rest with me, to be determined, but I shall represent the case to the King."—Vesey, jun. Chancery Reports, I. p. 112.

In the case of Cameron against Grey, on a motion to change the venue in an action for infringing a Patent, from Middlesex to Northumberland; before Lord Kenyon in the King's Bench, 13 June, 1795; the change was refused.

"The patent which is the substratum of the action, being at Westminster, affidavit cannot be properly made, that the cause of action arose wholly in Northumberland, and not elsewhere."—Durnford and East's Term Reports, Vol. 6, p. 363.

Boulton and Watt against Bull. An action for infringement of Mr. Watt's Patent of 1769, "for his method of lessening the consumption of Steam and Fuel in Fire Engines," the term of which had been prolonged by an Act, 15 Geo. III. for 25 years from 1775. Tried after Trinity Term, 1793, in the Common Pleas. Argued in Easter Term, 16th May, 1795, but the opinions of the Judges being equally divided, no judgment was given.

Two thirds of the patent right had been assigned to Mr. Boulton in 1777, for the remainder of the prolonged term. The infringement was proved, and also the sufficiency of the specification, to enable a mechanic acquainted with the fire-engines previously in use, to construct fire-engines, producing the effect of lessening the consumption of fire and steam in fire-engines, on the principle invented by Mr. Watt. A verdict given for the patentees; but the validity of the patent right being disputed on points of law, a

case was reserved for the opinion of the full court; and it was argued twice in 1795, at great length, before all the judges. 1st. Whether the patent was good in law, and continued in force by the Act of Parliament. 2d. Whether the specification was in point of law sufficient to support the patent.

The novelty, merit, and importance of Mr. Watt's invention was admitted; but it was argued that a patent for a method cannot be a new manufacture, within the meaning of the statute 21 James I.; that the specification only sets forth unorganized principles, and not any engine; that the Act 15 Geo. III. by which the patent was prolonged, was for certain engines of Mr. Watt's invention, when he had only invented improvements on engines known before.

Mr. Justice Rooke treated the objections as formal: Method of saving fuel in steam-engines, obviously implies some improvements in their construction, and those the jury have decided to be sufficiently specified. The term 'principles,' used in the specification, is equivocal, for it may denote, either the radical elementary truths of a science, or those consequential axioms which are founded on radical truths, but which are used as fundamental truths by those who do not have recourse to first principles; taken in the latter sense, principles, as used in the specification, may mean new mechanical employments of radical principles already known; and the means of employing are set forth.

Some part of the specification may be considered as merely theoretical, and I do not think an action could be maintained for breach thereof; because the patentee cannot anticipate protection before he is entitled to it by practical accomplishment; the most material articles were accomplished at the time of the patent, and they have been infringed. The mechanical improvement, and not the form of the machine, is the object of the patent; and if the mechanical improvement is intelligibly specified, (of which the jury must be the judges,) whether the patentee calls it principle, or method, or invention, we may protect him.

Mr. Justice Heath gave weight to the objections: The invention is to be put in practice by means of machinery, the organization of which may be the subject of a patent, but principles cannot. The term 'new manufactures' in the statute, means a vendible substance, either machinery, or a substance produced by a process. That which is the subject of a patent ought to be specified, and it ought to be that which is vendible, or it cannot be a new manufacture. I consider that Dollond's patent was substantially for an improved machine. The grant of a method is not good because uncertain.

The finding of the jury, that steam-engines may be made by the specification, is not conclusive; for the patent extends to all machinery that may be made on this principle, and that is more than

is specified; indeed it seems impossible to specify a principle and its application to all cases, which is an argument why it cannot be the subject of a patent.

Mr. Justice Buller was also against the patent. The jury had not decided wherein the invention consists: it is admitted that there was no new mechanical construction invented by Watt, but his discovery was a principle, the method of applying which is set forth in the specification, but it does not discribe in what manner any new machine is to be constructed, how it varies from the old one, or in what way the improvements are to be added. A principle is the first ground and rule for arts and sciences, the elements and rudiments of them. A patent must be for some new production from those elements, not for the elements themselves. If the principle alone be the foundation of this patent, it cannot stand, though the addition may be a great improvement. I think it impossible to support a patent for a method only, without having carried it into effect, and produced some new substance. Patents must be for new manufactures; and whether the manufacture be with or without principle, produced by accident or art, is immaterial. Dollond's patent was for object glasses, and the specification stated the method of making them. A patent may be for a specific compound article if it is new, although the articles of which it is composed are known.

I consider that principle in the patent, and engines in the act, mean the same; the patent is granted for the engine, but the invention was only an improvement. The admission that there was nothing new in the machine is decisive against the patent. Notwithstanding Bircot's case in Queen Elizabeth's time, I think a patent for an improvement may be good; that was the case in Morris *v.* Branson; but the patent must be confined to the invention, and nothing beyond. The public have a right to purchase that improvement by itself, without being encumbered with other things. (see Jessop's case.) The patentee here claims the right to the whole machine, and I am of opinion the patent cannot be sustained.

Lord Chief Justice Eyre supported the patent. I doubted at first on the trial, whether a patent can attach upon any thing not organized, and capable of precise specification,

We have had many cases upon patents, yet I think the ground was untrodden till this cause was instituted. Patent rights are no where accurately discussed in our books. Sir Edward Coke discourses largely, and sometimes not quite intelligibly, upon monopolies, in his Institutes, part 3, chap. 85; but he deals very much in generals, and says little or nothing of patent rights, as opposed to monopolies. He mentions Bircot's case, but the principle upon which that was determined has not been adhered to, in modern times,

The statute 21 James I, defines a monopoly to be the privilege of the sole buying, selling, making, working or using any thing within this realm; that is, what is prohibited. The saving by the 6th section is "letters patent for the sole working or making of any manner of new manufacture," obviously leaving the sole buying, selling and using, under the previous general prohibition; and with good reason, because the sole buying, selling and using, could hardly be brought within the next qualification of the saving clause, "not being contrary to law, nor mischievous to the state." Also the words "any manner of new manufacture," in the saving, fall short of the words "any thing," in the previous prohibition; certainly by usage, the exposition of this statute has gone very much beyond the letter. (see Edgeberry *v.* Stephens).

The word 'manufacture' is of extensive signification; things made by new composition is the most extraordinary sense, and a new piece of mechanism is a thing made. It also applies to the practice of making; all new artificial manners of operating by hand, or by known instruments; to principles carried into practice in a new manner; new processes in any art, producing effects useful to the public. When the effect produced is a new substance or composition, the patent must be for the new substance or composition, without regard to the mechanism or process by which it has been produced, which, though it may be new also, will only be useful as producing the new substance; hence Dollond's patent being for a method of producing, instead of for the thing produced, was perhaps objectionable. Dr. James's patent was for his fever powders, not for the method of preparing them. When the effect produced, is no substance or composition, the patent can only be for the new mechanism, if any is used; or if it be a new method of operating with old mechanism, for the process by which the effect is produced. Mr. Hartley's patent for fire plates is a case of a new method of using old things, but the effect is a negative, no substance at all: nor is new mechanism employed. I would say in the words of Lord Mansfield respecting copyrights, that the patent must be "for a method, detached from all physical existence whatever."

I think we should well consider what we do in this case, that we may not shake the foundation on which so many patents stand; three fourths of all patents granted since the statute 21 James, are for methods of operating, and of manufacturing, producing no new substances, and employing no new machinery; many of them inventions of great merit, which ought to stand; many of them probably mere speculations of wild projectors, which ought to fall. Mr. Watt's case shows the merit of a new

method of operating with old machinery; our mines cannot be worked without fire engines, and they are essentially necessary to carrying on many of our principal manufactures; they were before worked at an enormous expense of coals, and any method of lessening that consumption, is a great benefit to the public, as well as to individuals.

After the immense number of patents that have been granted, for methods of using old machinery, to produce substances that were old, but in a more beneficial manner, (and also for producing negative qualities, by which benefits result to the public), shall it be said by a narrow construction of the word 'manufacture, in the statute, that there can be no patents for methods producing this new and salutary effect, intimately connected as it is with the trade and manufactures of the country? This I am not prepared to say.

There can be no patent for a mere principle, but I think there may, for a principle so far embodied and connected with corporeal substances as to be in a condition to act, and to produce effects in any art, trade or manual occupation; this is, in my judgment, the thing for which Wr. Watt's patent was granted, and is what the specification describes, though it miscalls it a principle; it is not that the patentee has merely conceived an abstract notion, that the consumption of steam may be lessened, but he has discovered a practical mode of doing it; this is very different from a principle; it is a process. If the patent is to be taken, as for a fire-engine, I admit the specification is not sufficient, for it does not specify mechanism of any determined form, or having component parts capable of precise arrangements. But if the patent be in effect for a method of working fire engines, as its title imports, the specification points out what is to be done, and the jury have found that a workman can execute the improvement, in consequence of the specification. The machinery that the specification does not describe, is not the essence of the invention, but incidental to it.

It has been objected, that it is left unascertained by the specification, to what extent the consumption of steam would be lessened by the invention. To make the patent good, the method must be capable of lessening it so much as to make the invention useful; but more precision is not necessary; the quantity saved must depend upon a great variety of circumstances.

Objections have also been made to articles fourth and fifth of the specification, which are rather intimations of new projects of improvements in fire engines, than relative to the method of saving, which is the object of the patent; they are either very loosely described, or not very accurately conceived. If the defendant had not pirated the invention for lessening the consump-

tion of steam, which is sufficiently specified, but had merely done something to which those questionable parts of the specification were meant to relate, the objection would have been of weight, but the jury have decided the fact of infringement.

Another objection is, that the act 15 Geo. III. continues the patent for a machine, when in fact the patent is for a method. There is nothing technical in the composition or language of an Act of Parliament; in the exposition of statutes, the intent of Parliament is the guide; every statute ought to be expounded, not according to the letter, but the intent; and hence it is that an Act of Parliament may be extended by equity. No authority is cited that a mistake, in point of description in an Act of Parliament of this nature (when the true meaning can be discovered, and when there is a foundation on which the Act can be supported) shall vitiate it. I am not satisfied that the King, proceeding by and with the advice of Parliament (being then under the special protection of the law) is in that situation, that he could be considered as deceived in his grant, nor is any case cited. The specification calls the method of lessening consumption of fuel a principle, which it is not; the Act calls it an engine, which perhaps it is not; but both specification and Acts mean the same thing, and when taken with their correlative, are perfectly intelligible: hence I am of opinion that the Act has continued the patent.

Let it be remembered, that though monopolies in the eye of the law are odious, the consideration of the privilege created by by this patent is meritorious; for, to use the words of Lord Coke, "the inventor bringeth to and for the commonwealth, a new manufacture, by his invention, costs and charges." I conclude that the judgment should be for the patentee.

The court being thus equally divided in opinion, no judgment was given. Henry Blackstone's Reports, Vol. 2, p. 463.

(To be continued.)

New Patents Sealed, 1831.

To William Godfrey Kneller, of Hackney, in the county of Middlesex, Esq. for his invention of certain improve-

ments on stills, or apparatus for distilling.—29th June, 6 months.

To Jacob Perkins, of Fleet-street, in the city of London, engineer, for his invention of improvements in generating steam.—2nd July, 6 months.

To Baron Charles Wetterstedt, of the White Chapel Road, in the county of Middlesex, for his invention of a composition or combination of materials for sheathing, painting, or preserving ships' bottoms, and for other purposes.—6th July, 6 months.

To Robert Hicks, of Wimpole Street, in the county of Middlesex, surgeon, for his invention of certain improvements in culinary apparatus.—6th July, 6 months.

To Adolphe Jacquessou, of Leicester Square, in the county of Middlesex, Esq. in consequence of a communication made to him by a certain foreigner residing abroad, he is in possession of an invention for certain improvements in machinery, or apparatus applicable to lithographic and other printing.—6th July, 6 months.

To Richard Prosser, of Birmingham, in the county of Warwick, civil engineer, for his invention of certain improvements in manufacturing nails or tacks for ornamenting boxes and articles of furniture.—13th July, 2 months.

To John Milne, of Shaw, in the parish of Oldham, in the county of Lancaster, cotton spinner, for his invention of improvements on certain instruments or machines, commonly called roving frames, and slubbing frames, used for preparing cotton wool for spinning.—13th July, 6 months.

To Moses Poole, of the Patent Office, Lincoln's Inn, in the county of Middlesex, gentleman, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of certain improvements in steam engines, and in propelling boats, and other float-

ing bodies, parts of which improvements are applicable to other purposes.—13th July, 6 months.

To Augustus Demondion, of Old Fish Street Hill, in the city of London, in consequence of a communication made to him by a certain foreigner residing abroad, for an invention of certain improvements on guns, muskets, and other fire arms, and in cartridge, to be used therewith, and method of priming the same, and in the machinery for making the said guns, muskets, and fire arms, also the cartridges and priming, which improvements are also applicable to other purposes.—13 July, 6 months.

To James Pycroft, of Rolleston, near Burton on Trent, Staffordshire, Gentleman, for his invention of certain improvements connected with grates and other fire places. —13th July, 6 months.

To Sampson Mordan, of Castle Street, East Finsbury, in the county of Middlesex, engineer, for his invention of certain improvements in writing and drawing pens and penholders, and in the method of using them.—13th July, 2 months.

To William Batten, of Rochester, in the county of Kent, gentleman, for his invention of an apparatus for checking or stopping chain cables, which apparatus may be applied to other purposes.—13th July, 6 months.

To John de Burgh, Marquis of Clanricarde, in consequence of a communication made to him by a certain foreigner residing abroad, for certain improvements in fire arms, and in the projectiles to be used therewith.—15th July, 6 months.

CELESTIAL PHENOMENA, for August, 1831.

D.	H.	M.	S.	
1	0	0	0	Clock before the ☉ 6 min. 1 sec.
1	16	0	0	☾ in conj. with f in Taurus
2	12	0	0	☾ in conj. with γ in Taurus
2	13	0	0	♀ in conj. with β in Virgo
2	14	0	0	☾ in conj. with δ in Taurus
2	18	0	0	♂ in conj. with α in Leo
2	19	0	0	☾ in conj. with α in Tarus
4	5	0	0	☿ in conj. with α in Leo
4	15	0	0	☾ in conj. with ν in Gemini
5	0	0	0	Clock before the ☉ 5 min. 44 sec.
5	4	0	0	☿ in conj. with ♂ long. 28 in Cancer ☿ lat. 1 27 N. ♂ lat. 1 7 N. diff. of lat. 20
5	5	0	0	☾ in conj. with ζ in Gemini
7	10	3	0	Ecliptic conj. or ● new moon
14	22	24	0	☽ in □ first quarter
15	11	0	0	☽ in conj. with ♃ in Libra
16	0	0	0	Clock before the ☉ 4 min. 9 sec.
18	5	0	0	☿ in conj. with r in Leo.
19	11	0	0	☽ in conj. with d in Sagitt
20	0	0	0	Clock before the ☉ 3 min. 17 sec.
22	22	5	0	Eclip. oppon. or ○ full moon
23	11	0	0	☉ enters Virgo
24	1	0	0	☾ in conj. with 1 φ in Aquarius
25	0	0	0	Clock before the ☉ 2 min. 3 sec.
26	21	0	0	☾ in conj. with ν in Pisces
27	18	0	0	☾ in conj. with 2 ξ in Ceti
28	2	0	0	☾ in conj. with γ in Ceti
29	18	0	0	☾ in conj. with γ in Taurus
29	19	0	0	☾ in conj. with 1 δ in Taurus
29	20	0	0	☾ in conj. with 2 δ in Taurus
29	22	48	0	☾ in □ last quarter
30	0	0	0	Clock before the ☉ 37 sec.
30	1	0	0	☾ in conj. with α in Taurus
31	22	0	0	in conj. with ν in Gemini

J. LEWTHWAITE

The waxing moon ☽.—the waning moon ☾

Meteorological Journal, 1831.

1831.	Thermo.		Barometer.		Rain in inches.	1831.	Themor.		Barometer.		Rain in inches.
	Hig.	Low	High.	Low.			Hig.	Low	Hig.	Low.	
June						June					
26	69	46	29,61	29,59	,225	11	73	49	29,86	29,65	,15
27	64	46	29,87	29,84	,1	12	73	54	29,65	29,63	
28	64	47	29,89	29,88	,2	13	65	54	29,64	29,62	,925
29	60	44	Stat.	29,90	,075	14	65	54	29,69	29,64	,1
30	63	44	Stat.	29,92	,075	15	67	48	29,71	29,66	,45
July											
1	63	47	29,94	29,92		16	67	51	29,76	29,73	,425
2	75	49	29,94	29,93		17	74	50	29,94	29,85	,025
3	71	46	29,98	29,95		18	72	50	29,95	29,86	
4	76	49	30,05	30,02		19	70	51	29,86	29,85	
5	76	50	30,12	30,09		20	66	53	29,75	29,74	
6	77	48	30,19	30,14		21	69	51	29,69	29,59	
7	74	48	Stat.	30,26		22	67	45	29,78	29,75	,1
8	76	48	30,20	30,13		23	65	45	29,77	29,73	,025
9	82	49	Stat.	30,09		24	70	53	29,91	29,75	0,75
10	69	51	30,01	29,96		25	73	45	30,03	29,97	

Edmonton. *Charles Henry Adams.*

Latitude 51, 37, 32, N.
Longitude 3, 51, West of Greenwich.

THE

London

JOURNAL OF ARTS AND SCIENCES.

No. XLII.

[SECOND SERIES.]

Recent Patents.

To ANDREW SMITH, *of Princes Street, Leicester Square, in the parish of St. Martin-in-the-Fields, and county of Middlesex, engineer, for his invention of certain improvements in machinery for propelling boats or other vessels on water, and in the manner of constructing boats or vessels for carrying such machinery.*—[Sealed 22nd January, 1831.]

WE have often had the pleasure of laying before our readers the inventions of the above ingenious Patentee, and it is with much pleasure we are enabled to bring before their notice, the description of Mr. Smith's improved paddles, which have been repeatedly tried upon the river Thames, Forth and Clyde and Manchester Canals.

The Patentee describes his invention of certain improvements in machinery for propelling boats and other

vessels on water, and in the manner of constructing boats or vessels for carrying such machinery, to consist, in the *first* place, of a peculiar construction of paddles for propelling vessels designed to obviate the lifting of the back water, which imperfection in the common paddles of the wheel construction, occasions a great loss of power, and consequently retards the speed of the boat or vessel; and further, that they may enter the water in such a position as to take the greatest possible hold, and perform their stroke or action in it to the best advantage, and without causing the surge or motion on the surface of the water attendant on paddles of the wheel construction.

Secondly, in the construction of the boats or vessels for carrying propelling machinery intended for inland navigation, by which the surge or motion of the water caused by the action of the paddles is kept or directed in the middle of the canal, or in a direct line with the way of the boat or vessel, until it has partly subsided, so as to prevent injury to the banks or sides of the navigation. Figs. 1 and 2, Plate X, are representations of these improved paddles, in which fig. 1, is a side view (one of the side frames being removed, better to shew the parts). Fig. 2, is a plan or horizontal view of the same. The same letters referring to similar parts in these two figures. A, B, are two paddles or propellers, each consisting of two arms or levers *a, a,* connected together at their lower extremities by plates of iron, or other material, *b, b,* forming the surface of resistance against the water when in the act of propelling. These arms or levers are connected by joints *c, c,* to the crank arms *d, d,* at about two-thirds of their length from their lower points; from these cranks the paddles receive their motion. At the upper end of the arms *d, d,* are mounted the friction rollers *e, e,* on the ends of the cross stretcher *f;* these

rollers work in the grooves or slots between the side standards or guides *g, g,* which grooves or slots determine and command the motion of the paddles through the water.

The crank arms *d, d,* are connected by their short shafts *h, h,* to other cranks *i, i,* which cranks are connected together, so as to move simultaneously by the rods *k, k.* It will be obvious that there are many ways of giving motion to these cranks from the steam engine, or first mover, either by attaching the piston rod of the engine by connecting rods direct to the rods *k, k,* or to the cranks, or to the cross stretcher *l,* by the connecting rod *m.*

It will be seen by the drawings, that the whole of the paddles and connecting parts are mounted on side frames *n, n,* and are capable of adjustment through the screws *o, o,* by which the depth of the dip of the paddles may be increased or diminished as required.

Figs. 3 & 4, are similar representations of the paddles to figs. 1 & 2; but in these figures, there are no grooves or slots to guide the paddles, but the radius rods *h, h,* mounted in the side standards *q, q,* and connected to the upper ends of the arms of the paddles, answer the same purpose, and determine the action of the paddles, and cause them to perform the same motion. It will be seen that when one of the paddles is about leaving the water, having finished its stroke or action, the other is about entering to perform its operation; and further, it is obvious that the motion of the paddle through the water, may be diversified by altering the sweep of the cranks, the length of the paddle, the distance between the joints, and the friction rollers, the length of the raidius rods, or the position of the guides—all of which will materially alter its motion, and make it enter or leave the water in a more or less per-

pendicular position. It will also be seen that the second paddle is longer than the first, which will cause it to dip deeper, and to pass through a larger space in the water, at a quicker rate than its companion, by which it will take hold of the water displaced by the preceding paddle. When three, four, or more paddles are placed in a line to propel the same boat, they are all made to increase progressively in length for the same purpose.

The *second* part of these improvements is shewn in fig. 5, which is a side view of a boat, with part of the stern casing removed to shew the interior; fig. 6, is a plan view of the same. The Patentee finds, from practical experience, that where paddles are placed and worked in a channel made through the centre of the boat, that the water does not flow sufficiently through the channel to supply the paddles from the head, but upwards from the bottom; and as this construction of boat possesses many advantages for inland navigation, the Patentee proposes to place the paddles at the stern part of the vessel, in a short channel or chamber, open to the water at the bottom, as shewn in the sectional part in fig. 5, where *r, r,* is the channel or chamber, with the paddles *s, s,* mounted in the frame work, with their machinery placed in it. In order to confine the surge or motion of the water in a line with the way of the vessel, there is attached to the sides of the stern part of the boat, long guides, or conductors *t, t,* which are formed of sail cloth, or other strong, flexible material, distended by the small rods *u, u*; these guides are kept perpendicular by the lower ends of the rods being weighted by the small balls of lead, or other heavy substance *v, v,* and the pieces of cork *w, w,* floating on the surface of the water; the guides are also connected together by ropes or chains *x, x,* to prevent their being expanded by the force of the water

coming from the paddles. When the boat is to be passed through a lock in the canal, it is requisite that the guides or conductors *t, t,* should be drawn into or near to the stern of the boat; this is effected by winding or hauling in the ropes or chains *y, y,* which are passed through holes at top and bottom of the distending rods *u, u;* when the boat has passed through the lock, they may be let out again into their former position. It will be observed in fig. 6, that it is necessary in boats of this construction, to have two rudders, one on each side of the chamber, which may be worked by one tiller, as shewn in the figures.

The Patentee proceeds to state, in conclusion, that having particularly described his invention of certain improvements in machinery for propelling boats and other vessels on water, and in the manner of constructing boats or vessels for carrying such machinery, he wishes it to be understood, that he does not intend to confine himself to any particular mode of working the paddles, described under the first head of his specification, as there are various ways of connecting the cranks to the first mover; nor does he intend to confine himself to the use of two paddles only, as three, four, or more may be used in a line with each other with advantage, or to the peculiar mode described of adjusting them; but he does claim as his invention, the arrangement and construction of the paddles, cranks, and guides, or radius rods, as above described, by which the desired motion is given to the paddles; and he also claims as his invention, the progressively increasing the length of two or more paddles, of any description, when placed one before the other in a line, in order to make them dip deeper into the water, and pass through it at a quicker rate, and to take hold of the water displaced by the preceding paddle after it

has left it; and further, he states that he does not intend to confine himself to the making of the guides or conductors described under the *second* head of sail cloth, or other flexible material only, as they may be formed of long pieces of wood, which may be extended from, or drawn into the boat, or up out of the water, by rack-work and pinions, or in any other way; but he does claim as his invention, the application of such moveable guides in connection with the boat for the purpose above stated. —[*Inrolled in the Rolls Chapel Office, July,* 1831.]

Specification drawn by Messrs. Newton and Berry.

To Samuel Dunn, *of Southampton, engineer, for his having invented certain improvements in, or method of, generating steam.*—[Sealed 21st Feb. 1831.]

The invention for which this Patent is granted, consists in a peculiar mode of applying the flame of ignited gas to heat a boiler for the purposes of generating steam, which is effected by inserting a series of vertical tubes in the boiler, extending upwards from the bottom, these tubes being heated by gas burners, in the manner shown in fig. 1, and Plate XI, which is a horizontal section of a circular boiler, containing a series of vertical tubes; fig. 2, is a vertical section of the same, taken through the centre: the same letters pointing out similar parts in both figures; *a, a, a, a,* is the circular plate of iron or copper, of which the external part of the boiler is formed; *b, b,* is the bottom plate of the boiler, perforated with any desired number of circular holes, as shown in fig. 1, into which are inserted the vertical circular tubes *c, c,* open at the bottom, and made fast to the plate *b, b,* at

their open ends, by flanges and screws, or rivets, or other suitable means, which tubes *c, c,* then constitute part of the boiler, and tend to increase the surface, against which the heat is to act. The boiler is encompassed with a jacket or case of iron *d, d,* corresponding to its own shape, which forms a channel surrounding the boiler for the passage of heated air, or vapour to the chimney *e*; this boiler and its jacket rests upon the bottom plate *f, f,* which is made strong by bracing ribs, and is supported upon pieces of brick work or masonry; the outer part of the jacket is surrounded with sand or charcoal, or other imperfect conductor of heat, and which is confined by a casing of wood or bricks.

The plate *f,* is perforated with holes corresponding to those in the bottom of the boiler, but not quite so large; in which holes are inserted pipes *g, g,* open at both ends, but having flanges at bottom for fastening them to the plate *f*; each of these pipes therefore when so fixed, stands vertically in the centre of the tubes *c*; they are intended as flues for conducting the flame and heated air, from the gas burner to the surface of the boiler; *h, h, h,* are argand burners, supplied by service pipes *i, i,* with gas from a main *k, k*; the burners are each of them enclosed by a glass chimney, of the ordinary construction, the upper part of each chimney fitting closely into the pipe *g,* in order to prevent, as much as possible, the passage of atmospheric air, which should be only passed through the glass chimney, to support the combustion of the gas. The apparatus being so constructed, the flame and heated air proceed from the ignited gas at the burners *h,* passing up the pipes *g,* and striking the concave tops of the tubes *c,* and thence descend by the channel between the outer surface of the pipe *g,* and the inner surface of the tube *c*; and after passing

under the bottom of the boiler, proceed up the external sides, and escapes by the chimney *e*, at top, by means of which arrangement, the heat, from the combustion of this gas, has been made to act upon a greatly extended surface of the boiler, and consequently to generate steam with great rapidity. The Patentee states, in conclusion, that he has shown his improved mode of generating steam, by means of gas burners, applied within tubes in the interior of a boiler or vessel containing water; but he does not however intend to confine himself to any precise number of burners or tubes, or to their forms, or dimensions, or distance apart, but rests his claim of invention to the application of gas burners to tubes inserted in or passing through a vessel containing water, for the purpose of producing or generating steam, for any purpose to which steam may be applicable.—[*Inrolled in the Rolls Chapel Office, August,* 1831.]

Specification drawn by Messrs. Newton and Berry.

To JOHN PHILLIPS, *of Arnold, in the county of Nottingham, servant man, for his having invented or found out certain improvements on bridles.*—[Sealed 21st February, 1831.]

THESE improvements on bridles, as stated by the Patentee, are designed to be applied as an effectual means of curbing and governing a restive horse, and consist in the construction and attachment to an ordinary snaffle bridle for riding or driving, a mechanical apparatus to be connected to the bit, by means of which very considerable leverage may be obtained, and applied to the horse's mouth, for the purpose of drawing the bit back in the

mouth, in order to restrain his speed when running, or completely stop his action. In Plate XI, fig. 3, represents the head of a horse with an ordinary snaffle bridle, to which this improved apparatus is connected; fig. 4, shews the improved apparatus detached; *a*, is a small pulley, one of which is to be attached on each side of the head to the headstall of the bridle, near the horse's ears; *b*, is a similar pulley to be attached on each side of the horse's mouth to the rings of the bit; to the lower of these pullies is connected, by means of a staple *c*, a flat strap *d*; this strap is united to a round strap *e*, *e*, or it may be produced by the elongation of *d*; this round strap is conducted over the pulley *a*, on each side of the horse's head and downwards, so as to pass under the pulley *b*; and to the extremities of these straps *e*, is attached a rein *f*, which may be called the safety rein. Whenever this rein is drawn tight, the strap *e*, passing round the pullies *a*, and *b*, will have a tendency to draw the said pullies together, and consequently to draw up the bit to which the lower pullies *b*, are attached, and bring the bit further into the horse's mouth.

By means therefore of this or a similar adaptation of pullies, and a drawing strap on each side of the bridle, in the way above described, the rider or driver is enabled to exert so great a power or force upon the bit in the horse's mouth, as to keep the most unruly animal perfectly under controul. In order to adapt the same mechanical principle for curbing, to the bridle of a horse which has to be led, the Patentee proposes to attach, in place of the pulley *b*, a pulley with two extra small rollers, as shewn in the detached figs. 5 & 6, between which small rollers the strap *e*, is passed, and by that means any person will be enabled while leading a horse, to exert the same leverage upon the bit in his mouth, and to draw up

the bit with the same effect as in riding or driving. The Patentee proceeds to state, that he claims as his improvement on bridles for horses, the adaptation of pullies connected in any convenient way to the bridle near the horse's ears, and also pullies to be attached to the bit, or connected thereto, near the horse's mouth, in any convenient way, and likewise a drawing strap or cord, passing over these pullies, to be connected to a safety rein, for the purpose of enabling the rider or driver to exert his power with great effect in drawing back the bit, and thereby keeping the horse perfectly under command with very little exertion. [*Inrolled in the Roll's Chapel Office, August,* 1831.]

Specification drawn by Messrs. Newton and Berry.

To George Vaughan Palmer, *of the parish of St. Peter, in the city of Worcester, artist, for his having invented a machine to cut and excavate earth.*—[Sealed 8th June, 1830.]

The engine or machine described by the Patentee in his specification for cutting or excavating earth, is similar in its construction to the operative parts of the common floating dredging machines used in rivers and harbours, to clear away the shoals of sand, &c. with the addition of an apparatus consisting of knives or peckers, which act upon the earth to be removed, and prepare it for the scoops or buckets mounted on an endless chain to take it away. The engine or machine is mounted on a strong moveable frame or carriage, supported by wheels, the lower part of which must be let down into the earth to the depth it has to excavate, by first preparing a hole sufficiently large to admit of it; the machine may then be set to work by hand or other means, and as the earth is cut

or pecked down by the knives or peckers, the carriages take it away, the engine being made to proceed as the earth is removed.

The Patentee first states in his specification, that his method of cutting and excavating earth consists in the manner of adapting knives or cutters of suitable shapes and sizes, to excavate any depth or width of earth required (in proportion to the motive power), therefore whatever breadth and depth the engine is intended to excavate (at one time) will determine the size of the knives or cutters intended to be used. Fig. 7, Plate XI, is a side view of the engine or machine as it appears when put in operation, which is done by giving a rotatory motion to the cranks *a*, by winch handles, or otherwise; these cranks are connected by the rods *b*, to one end of the levers or beams *c*, moving on fulcrum bearings *d*, and carrying on their other ends the knives, cutters, or peckers *e*, *f*, which act upon the earth to be removed. The motion communicated to the beams or levers *c*, by the cranks *a*, when in operation, cause the ends of the beams, and with them the cutters or peckers, to be raised and slide downwards, cutting the whole breadth and depth of the face of the earth to which they are applied.

On each rising of the cutters the engine is made to advance forward on a rail way *g*, by means of the chain *h*, passed over pullies *i*, *i*, over the chain wheel *j*, and toothed wheel *k*; this advancing motion is restrained or locked by a pall *l*, dropping into the teeth of the wheel *k*, attached to the carriage wheel *c*, during the act of cutting. The earth thus removed by the peckers falls to the bottom of the excavation, where it is taken up by the boxes or receivers *m*, *m*, which are assisted by a drag or scraper *n*, having a motion similar to that of a pick axe when used by a labourer. In some soils the machine may

be made to work without the front knives *e*. The boxes or carriers *o*, *o*, *o*, when filled, are conveyed up the inclined plane beams *p*, by means of endless chain *q*, and discharge their load as in common dredging machines.

The Patentee proposes to use various kinds of knives, peckers, or scrapers, some of which he calls half peckers (see fig. 8), which have a motion like that of a pickaxe when used by hand, or performing a segment of a circle. They will then cut and drag the earth, without the assistance of knives or scrapers. When complete peckers are used, which are pieces of iron, shaped like the letter S, (see fig. 9), fixed on a shaft, they are to have a complete rotatory motion given to them in the following manner: the rods *b*, are removed, and the beams or levers *c*, are made stationary, by passing a bolt through one end of them.

The revolving peckers are connected by a band or chain passed over a pulley on their axle, from the wheel or pulley *i*, on the fly wheel shaft, or from the wheel *k*, which gives the forward or advancing motion.

It has to be remarked, that the carriage of the machine remains stationary, while the peckers are in actual operation upon the earth, and that it advances during the time the knives, peckers, &c. are ascending or out of operation; this is effected by the pall *l*, which is raised by the chain wheel *j*, as it revolves and advances the carriage one, two, or more cogs of the wheel *k*, at a time, as the nature of the soil will allow.—[*Inrolled in the Inrolment Office, December*, 1830.]

To Seth Smith, *of Wilton Crescent, in the parish of St. George, Hanover Square, in the county of Middlesex, builder, for his invention of certain improvements in chimnies for dwelling and other houses and buildings.*—[Sealed Sept. 14th 1830.]

In the specification of the above Patent, the invention is described to consist—*first,* in lining the chimnies for dwelling and other houses and buildings with metallic tubes; and, *second,* in a draft regulator, or damper placed at the bottom of the chimney, to be used instead of a fire board, to prevent the back draft when the fire is out. It is obvious that these tubes or linings must be shaped, bent, or turned in various directions and in different angles, to suit the shape and direction of the chimnies to be built.

The Patentee has shewn in the drawings accompanying his specification, the sectional elevation of a stack of chimnies for five fire places on different floors, which are unnecessary for us to shew, as there is nothing particular in their construction but their being lined with the metallic tubing.

Figs. 10, 11, 12, 13, and 14, are representations of several pieces of tubing, by which various directions and turns in chimnies may be obtained. Fig. 15, is the general plan of all the tubing; the pieces of tubes are made of cast iron, and fitted together by means of a flange lip or rim, as shewn in the figures.

Fig. 16, is a section of the draft regulator, or damper, in its proper position in the chimney and fire place; *a, b,* are two cones, united by flanges at their bases, the upper one being furnished with a gutter lip *c,* into which the bottom of the chimney lining or first plate *d,* fits. This plate *d,* is a circular ring of iron, on which the first

piece of metal tube or lining is placed. The Patentee calls this the starting plate: a plan view of which is shewn in fig. 17; *e, e,* is a bar of iron, carrying two pullies *f, f*; over these pullies two chains *g, g,* are passed, which are connected to the double cone or damper at one end, and at the other to the rod of the balance weight *h*. It is obvious by this arrangement, that when the balance weight *h*, is raised, the double cone or damper will descend, thus opening an increased passage up the chimney for the air; and, on the contrary, if kept up and closed, as shewn in fig. 16, no air can pass up or down the chimney. The damper can be kept secured in its place by the screw nut *k*, on the rod of the balance weight. When the passage up the chimney is opened to its greatest extent, the damper will be in the position shewn by the dotted lines in fig. 16.

It is proper to observe, that when the damper is intended to be used in the chimney, it is necessary to cast a recess in the first piece of tubing or lining above the starting plate, for the purpose of receiving the ends of the cross bar *e*. The Patentee states in conclusion, that he claims as his invention the two improvements as described.—[*Inrolled in the Petty Bag Office, Nov.* 1830.]

To Paul Descroizilles, *of Fenchurch* Street, *in the city of London, chemist, for his having invented improvements in apparatus for economizing fuel in heating water and air, applicable to various purposes.* —[Sealed 24th April, 1830.]

The invention specified under this Patent is the application of the hot water, which is allowed to run to waste from steam engines and various manufactories, for the purpose

of heating liquids or air for any purpose required by the apparatus described by the Patentee, which consists of a square case or box, divided into four chambers. Over these chambers is placed a horizontal pipe, leading to the boiler, intended to receive the benefit of the caloric from the waste water; from this pipe there is another, which branches off in a great many small tubes, and descends down the chamber. These tubes are collected at the bottom into a trough and pipe, which leads under the first partition into the second chamber, where there is another similar set of tubes and pipes through which the water to be heated passes upward, and over the next partition, and through a third set of tubes, down the third chamber and up the fourth, which has also its set of tubes terminating in a pipe connected to the boiler pipe first mentioned. The waste or hot water is admitted into the first chamber, and is made to flow under and over the partitions into and through the chambers in the same way as the water through the pipes and tubes, by which it will cover the extensive surfaces of the small tubes containing the water to be heated, and impart to it a great portion of its caloric before passing off.

The boiler pipe has a stop cock, placed between the two branch pipes, which have also a stop cock in them, so that the water may or may not be made to flow through this apparatus at pleasure.

It is obvious that air may be forced through the sets of tubes instead of water, for the purpose of heating rooms and buildings; or liquids intended to be cooled, may be passed through them, and cold air, in place of the hot water in the chambers.—[*Inrolled in the Inrolment Office, October,* 1830.

To James Perry, *of Red Lion Square, Holborn, in the county of Middlesex, bookseller and stationer, for his invention of an improvement or improvements in or on pens.*—[Sealed 24th April, 1830.]

The peculiar feature of novelty which the Patentee claims as his invention, consists in forming the slits of metallic pens shorter than in common steel pens (or upon the principle of the goose quill), and enlarging the top part of the slit into an opening, or making it branch off in two directions, following the shape of the nib; and also in keeping the whole of the slit and opening below the shoulder of the pen, that is, in the nib part, by which a more perfect elasticity is obtained, and a better flow of ink to the point of the nib.

It would not be supposed that there was much novelty in this invention, or any good effect produced by this peculiar construction of pen; but there certainly is a decided superiority in these metallic pens over others, as most of our readers know from experience, for they seem to have expelled the common goose quill from almost every counting house or office.

Fig. 18, Plate XI, is a view of one of these pens, with the slit branching in two directions; and fig. 19, is a view of one having the top part of the slit enlarged into the opening; this is formed by removing the tongue piece *a*, fig. 18, or that part between the two branch slits.—[*Inrolled in the Inrolment Office, October*, 1830.]

To Edwin Clayton, *of Bridlesmith Gate, in the town and county of the town of Nottingham, baker, for his invention of an improved mode of manufacturing dough or paste, for the purpose of baking into bread.*—[Sealed August 31st, 1830.]

The Patentee describes as his invention, the causing of a square iron frame to have a rotatory motion in the interior

of a barrel, which has also a revolving motion, but in a contrary direction to the frame.

This iron frame is moveable; but when in operation, is mounted on an axle passed through the barrel. On this frame may be placed knives, which act on the dough contained in the barrel; the axle of the barrel is hollow at one end, and the axle of the frame is passed through it; the other end of the frame axle bears in a socket in the barrel. The two axles are connected together by a pair of spur wheels, which may be put in or out of gear by screws for that purpose.

The appearance of this machine or apparatus is like that of a common barrel churn, and is turned by a winch handle in the same way. There is a door or opening in the barrel, through which the flour to be kneaded is put with the water, and the opening being fastened down, the operation may be commenced, and the process watched through a small pane of glass let into the barrel; when finished, the kneaded dough may be taken out of the same hole, and the interior frame taken to pieces and out of the barrel, for the purpose of cleaning.—[*Inrolled in the Inrolment Office, February,* 1831.]

To SAMUEL BROWN, *of Billiter Square, in the city of London, commander in the Royal Navy, for his invention of certain improvements in making or manufacturing bolts or chains.*—[Sealed 24th of April, 1830.]

THE principal feature described under this Patent, is the enlargement of the thickness of the bolt at the nut or weld; and also in the point of the scarf, where chain cables, &c. have often been found to give way and break in proving, or when any great strain is put upon

them. The iron which is used to form the bolt, is passed through rollers in the usual manner, and at the same heat through a pair of conical rollers, round the circumference of which are formed semicircular grooves as in the first pair, but decreasing progressively in diameter as they approach the apex of the cone. These grooves are enlarged at one part, which form corresponding projections on the bolt or bar of iron, and from the rollers being conical, the length of the bolts, or rather the distance between the enlarged parts, is regulated to the size of the link required. The bolt or bar of iron may be drawn through three different sized grooves, commencing with the largest. The scarf, as it is called, is cut at twice the diameter of the bar of bolt iron, in the thicker or enlarged part, when the ends may be welded together in the usual way.—[*Inrolled in the Inrolment Office, October,* 1830.]

To THOMAS WALMSLEY, *of Manchester, in the county of Lancaster, manufacturer, for his invention of improvements in the manufacture of cotton, linen, silk, and other fibrous substances, into a fabric or fabrics applicable to various useful purposes.*—[Sealed 13th December, 1830.]

THE invention described by the Patentee in the specification of the above Patent, consists in producing a fabric by combining layers of unwoven or unspun fibres of cotton, silk, &c. with starch, glue, gum, or flour paste, so as to form a sheet or fabric, without going through the process of weaving.

The cotton or other material is prepared for carding in the manner usually employed in the manufacture of the different substances, and after passing through a common carding engine, is delivered from the doffer-roller in

a thin flake or sliver on to an endless cloth, from whence it is conducted to a starching apparatus consisting of a cylinder, &c. and is returned back to take up another sliver of material, until it is of sufficient substance for the purpose required; it is then passed through pressing rollers, which make it effectually combine with the glue, starch, &c. and from thence on to drying cylinders, when it may be considered finished.—[*Inrolled in the Inrolment Office, June,* 1831.]

To Richard Edwards, *of Dewsbury, in the county of York, leather and hock seller, for his invention of an improvement on or substitute for glass, sand, or emery and other scouring papers or substances.*—[Sealed 6th December, 1830.]

The invention claimed by the Patentee under the above title, is the application of linen, calico, or other woven fibrous substances, for the purpose of forming a back or foundation to sand, emery, pounded glass, &c. instead of paper, which when manufactured, is intended to form a substitute for all kinds of scouring papers.

The linen, cotton, &c. after being tightly spread or stretched upon a board, is to be covered with a coating of paper pulp, or thick paste, for the purpose of filling up the interstices between the threads, and when dry is to be again covered with a coating of a cement or size made of glue and alum, consisting of one pound of glue to half an ounce of alum, both dissolved in one pint of water; the ground glass, emery, sand, or other material is then to be thickly laid over by hand, and after the superfluous material is shaken off, the whole is to be perfectly dried; when this is done, another coating of the cement may be applied, and when this is also dried, the article will be fit for use.—[*Inrolled in the Inrolment Office,* 1831.]

To Robert Dalglish, Jun. *of Glasgow, calico printer, for his invention of improvements in machinery or apparatus for printing calicos and other fabrics.*— [Sealed 6th December, 1830.]

This invention consists in the application of the addition of an apparatus to the common printing cylinder, or other machines employed for printing calicos, &c. by which certain parts of the piece goods under operation are left blank without any impression from the cylinder, which blanks may be subsequently filled up by any other pattern or parts of any pattern. The apparatus as described, is a very simple mode of stopping out, as it is called, and consists of the addition to the machine of two endless chains or bands, passed over pullies, or spur wheels, placed parallel with the piece of calico. These bands are connected together by transverse straps of suitable shape and dimensions, and placed at proper intervals, as they form the stoppers or blanks in the printed goods, and may be made of any shape required.

These endless chains and straps are conducted out of the way of the other parts of the press, and at some distance from the piece of calico, until it arrives near the printing cylinder, when they intervene between their two surfaces, and prevent the part of the fabric they cover from receiving any impression from the cylinder. After passing through the printing rollers, the chains and straps are conducted out of the way of the piece of calico, which is carried to the drying cylinder as usual. The chains and straps are of course made to travel at the same speed as the piece of calico by proper gear, so that the blanks are produced at equal distances from each other.—[*Inrolled in the Inrolment Office, June,* 1831.]

To BENJAMIN ROTCH, *of Furnival's Inn, in the county of Middlesex, barrister at law, for his invention of improved guards or protectors for horses' legs and feet, under certain circumstances.*—[Sealed March 20th, 1830.]

THE subject of the invention, described by the Patentee under the above title, is the application of coverings made of caoutchouc, or Indian rubber, to protect the tender feet of young horses, and also to prevent injury to the knees by falling.

The inventor describes in his specification, a boot, made of the above material, which is to cover the hoof and fetlock joint of the horse, having a piece of sheet iron with tongues, made to double over the hoof, in order to prevent its wearing out too soon. This plate of iron may be connected by rivets or other means to the bottom of the shoe. These shoes, and also the knee caps or bandages, may be made out of the common India rubber bottles of commerce.

In forming these boots or coverings for the legs into the shape required, the Patentee directs that, after cutting off the necks of the bottles and making a hole through the bottom, they are to be immersed in warm water; and after becoming sufficiently soft and pliable, they are to be drawn or stretched over blocks of the proper shape.

When they are to be applied to the horse's legs, they are to be drawn over the hoof, the elasticity of the material allowing of this being done, and when once in place, the elastic power will keep them in their proper situation, without injury to or cramping the action of the animal. The inventor presumes that these boots will be found useful for horses turned out in wet lands, and also for breaking-in young colts.—[*Inrolled in the Inrolment Office, March,* 1831.]

To THOMAS RICHARD GUPPY, *of the city of Bristol, sugar refiner, for his having invented a new apparatus for granulating sugar.*—[Sealed 6th March, 1830.]

THE apparatus described in the specification of this Patent, consists of a cylindrical receiver or vessel, which is placed over the sugar pan; the bottom plate of this receiver is pierced with a considerable number of small holes, and there is also a pipe leading to an exhausting apparatus from the top; the lower end of the receiver should nearly touch the bottom of the pan. When the sugar to be granulated, is placed in the pan, the air is to be exhausted to a certain extent from out of the receiver, the sugar will then rise to any required height in it; the exhaustion of the air is to be continued to any degree required during the operation, and on this being performed, the Patentee says that the exterior air will continue to force itself through the liquid and up through the holes in the bottom of the exhausted receiver. The inventor farther describes, that the same effect may be obtained, supposing the sugar pan be entirely covered with small tubes passed over its sides near to the bottom of the receiver, instead of its perforated bottom plate. He further states that by causing air to pass through the sugar by the above described method, he will be enabled to boil it at any temperature without danger of injury to its colour or quality, either by steam surrounding the pan or other means.—[*Inrolled in the Inrolment Office, September,* 1830.]

To THOMAS FORD, *of Canonbury Square, Islington, in the county of Middlesex, chemist, nephew and successor to the late* ROBERT FORD, *for his having invented certain improvements in the medicine for the cure of coughs, colds, asthmas, and consumptions, known by the name of* FORD'S *Balsam of Horehound.* —[Sealed 12th August, 1830.]

THE Patentee describes his invention to be in the application or addition of squill root, salt of tartar, and extract of poppies to the original medicine, patented by his father, Mr. Robert Ford, Nov. 21, 1816, and states the proportions to be as follow :—

3½ lbs. of the herb of horehound
3½ lbs. of liquorice root
½ lb. squill root.

To which is to be added as much water as will infuse it in a still for six days, if necessary; the quantity of the water being regulated according to the strength or quality of the horehound. Of this extract take sixteen pints, and mix it with—

12 pints of spirits of wine, or good French brandy
1 oz. gum camphor
1¼ oz. extract of Turkey opium
1 oz. of gum Benzoin
4 drachms extract of poppies
4 oz. salt of tartar
8 drachms oil of anniseed
3½ lbs. clarified honey.

These are to be mixed, and allowed to be digested for about twenty-eight days in a close cask.

The Patentee states, that though he has mentioned the time and proportions most convenient, a slight variation will produce the same effect.—[*Inrolled in the Inrolment Office, October.* 1830.]

To Æneas Coffey, *of the Dock Distillery, Dublin, distiller, for his having invented certain improvements in the process, or machinery used in the process of brewing and distilling.*—[Sealed 5th August, 1830.]

The Patentee describes in his specification of this Patent, that his invention consists—*first*, in an improved apparatus for cooling brewer's or distiller's wort, which is also applicable to other purposes, in the processes of brewing and distilling; and is constructed as shewn in fig. 1, Plate XII; *a*, is a vessel open at the top, and made of copper, tinned, but other material may answer as well; this vessel is connected by a number of short tubes *b, b, b*, to the lower chamber or closed vessel *c*, having a discharge cock *d*. These pipes or tubes *b, b*, are to be made no longer than can be conveniently cleaned by means of a straight rod and sponge, and are to be well fastened by soldering or otherwise to the top and bottom of the lower and upper vessel, so as to form a perfect water-tight communication between the two vessels.

This apparatus is to be immersed in a cistern or bath *e, e*, of cold water, of sufficient dimensions; the supply of cold water flowing down the pipe *f*, and up through the cistern and apparatus, whence it is discharged at the pipe *g*. The hot wort, to be cooled in its passages through this apparatus, is to be let into the chamber or vessel *a*, whence it will flow down the tubes *b, b*, through the cold water, and out at the discharge pipe *d*; *h, h*, is a large tube in the centre, to allow the introduction of a spindle or shaft *i*, and a stirer or agitator *j*, which has a rotatory motion in the bottom vessel *c*.

The Patentee states he does not make an exclusive claim to the principle or practice of using pipes or tubes, immersed in water, for cooling brewer's or distiller's wort,

but he does claim as his invention the improved arrangement of such pipes, by making them in short lengths placed in a perpendicular direction, so as to be easily cleaned by a rod and sponge.

This same arrangement of the pipes, or tubes and vessels, may also be used with advantage in heating wort or distiller's wash, by passing it through the tubes, and by making the external vessel or cistern steam tight, and filling it with steam instead of cold water.

The next improvement described by the Patentee, is an apparatus used in the process of distilling, and is represented in fig. 2. Plate XII; *a, b, c, d,* is a sectional view of that part of the distilling apparatus wherein the wash is deprived of its alcohol, and the vapours analyzed; it is described to consist of a chamber or vessel *a*, with the vertical chamber placed above it *b, b;* the lower half of this chamber is divided into compartments by horizontal plates *e, e, e,* of thin copper or other metal; each of these plates is turned down at one side, until it nearly touches the plate next underneath it, as shewn in the fig. at *f*, thus leaving a passage throughout the whole of them, by which any liquid falling on the top plate may descend into the next under it, and from that to the third and so on, from plate to plate at the alternate ends until it arrives at the last plate, wherein it falls into the vessel *a*, by the pipe *f;* each of these plates is furnished with several light valves, opening upwards, through which any steam or vapour may ascend; it may also be perforated with holes, but they must not be so numerous or so large as to allow of all the steam passing through them without raising the valves; *e*, is a pipe by which the alcoholic vapour, after it has been analyzed and has acquired the proper strength, is conducted into the vessel *d*, which is made perfectly close; the vapour will here be condensed

on the surface of the pipe *g, g, g*; from this chamber it will descend in a liquid state into the pipe *h,* whence it may be conducted to a worm or refrigerator, to be cooled in the ordinary way; *i,* is a vessel through which the spent wash flows, after being operated upon in the distilling apparatus, and is discharged in a state of ebullition; *j,* is a vessel or chamber containing the wash to be distilled; a force pump may be substituted to force the wash through the pipes *k,* and distilling apparatus with the velocity required.

The Patentee states that it is requisite the wash should be passed through the pipes *k,* with sufficient velocity and force so as to prevent the deposition of sediment in the pipe *k*; the wash in its passage through the pipe *k,* will gradually become increased in temperature as it passes through the spent wash in the chamber, and the close vessel *d,* until it is discharged nearly at the boiling point on the upper plate, in the chamber, where it comes in contact with the vapours arising from the vessel *a.*

It is to be observed that the wort does not reach the boiling point while in the pipe *k, k*; to ascertain which a thermometer is placed on the pipe, and by increasing or diminishing the quantity of wash, its temperature may be regulated. The wash, after being discharged from the pipe *k,* descends from plate to plate as before mentioned, at which time a supply of steam from a boiler, or generator is admitted into the apparatus, through the pipe.

The lower part of this pipe in the vessel *a,* is pierced with a number of small holes, so as to spread the steam over the vessel; it then rises upwards, passing through the plate by the small holes and valves, and through the stratum or sheet of wash flowing over them; the wash as it descends gives out a portion of its alcohol to the steam as it passes over every plate, until it is entirely deprived of its spirit, which it will generally do by the time

it arrives at the 7th or 8th plate, but it is better to employ a greater number to guard against accidents or neglect.

A small steam pipe rises from the chamber *a*, with its upper end opening into the box or chamber; into this chamber the end of a worm projects from the cistern of cold water; the steam rising up the pipe is nearly all condensed in the worm, and flows back into the chamber *a*, by the pipe; the small portion of the steam uncondensed, is allowed to escape at the upper ends of the worm, and the flame of a small lamp or taper is to be constantly kept over the orifice, when, should the least quantity of alcohol descend with the wash into the chamber *a*, it will rise with the steam through the pipe and worm, which immediately take fire from the flame of the lamp or taper, thereby warning the attendant to increase the supply of steam, or diminish the quantity of wash, as may seem necessary.

The Patentee states, in conclusion, that this apparatus may be varied in many of its details according to local and other circumstances; but that he claims as his invention—*first*, the plan and practice of forcing the wash to pass rapidly through a pipe or pipes of small diameter, during the time it is acquiring heat, and before it reaches its boiling temperature; *second*, in the plan and practice of causing the wash, after it has come in contact with the vapours, to flow in a continued and uninterrupted stream over numerous metallic plates, furnished with valves as described; and, *third*, the method of ascertaining whether or not the wash be exhausted of its alcohol, by means of the apparatus described, or any similar apparatus, whereby the vapour to be tried undergoes a process of analyzation or rectification, and is deprived of much of its aqueous parts before it is submitted to trial.—[*Inrolled in the Inrolment Office, February,* 1831.]

To Enoch William Rudder, *and* Robert Matineau, *of Birmingham, in the county of Warwick, cock-founders, for their having invented certain improvements in cocks for drawing off liquids.*—[Sealed 27th Feb. 1830.]

This invention is the making or forming of cocks for drawing off liquids out of several pieces of metal, which have been previously rolled, laminated, and stamped to the required shapes and sizes.

The barrel part of the cock is to be formed of two separate pieces of metal, stamped to the required form in a die, and after being turned, their edges are to be united; they will then form the inside of the barrel. Two other pieces of metal are also to be prepared as above, and when ready, they are to be placed the one within the other, and submitted to a moderate heat, when they will by the solder, form a complete solid barrel; if additional strength should be required, the inside part of the barrel may be made of a piece of solid cast metal bored in the usual way.

The key may likewise be formed out of two pieces of stamped metal, and when their edges are united by solder, &c. will form a complete key.—[*Inrolled in the Inrolment Office, August,* 1830.]

To Henry George Pearce, *of Liverpool, in the county of Lancaster, master mariner, and* Richard Gardner *and* Joseph Gardner, *of the same place, merchants, for an improved fid.*—[Sealed September 7th, 1830.]

The Patentees state in their specification, that their improved fid can either be used by itself, for sustaining the top-masts, or other upper masts of ships and vessels,

or it may be used together with the wooden or metal fid commonly employed for that purpose; and that this improved fid is also adapted for heaving up the top-mast for the purpose of tightening the rigging, or for lowering it, in order to slacken the same.

Fig. 3, Plate XII, is a front view of the improved fid. It consists of a strong bar of iron or other metal *a*, having at each end two strong powerful screws *b*, *b*, with square threads. The heads of these screws have holes for the insertion of a lever handle to turn them round; the points of the screws should be hemispherical, and fit into corresponding cavities, in metal sockets *c*, *c*, shewn in section; these sockets are to be firmly fastened by screws, or other means, to the upper surface of the tressel trees of the lower masts.

The bar of the fid may be made either square or of a dove-tail form, and the screws may have different kinds of threads to suit the weight of different masts. Fig. 4, is a side view of a portion of the upper and lower masts of a vessel, shewing the improved fid adapted to them; fig. 5, is a front view of the same.

In fig. 4, this improved fid is shewn as applied by itself to sustain the weight of the upper mast, in fig. 5; the common fid is also shewn as used in conjunction with it; *d*, is the lower part of the top-mast; *e*, *e*, are the tressel-trees of the lower mast *f*; *a*, is the bar of the improved fid inserted through a fid or mortice hole, in the lower end of the top-mast *d*; *b*, *b*, are the screws resting on the sockets *e*, fastened to the tressel-trees *f*, *e*.

It will be seen that the screws and bar sustain the weight of the mast, which can be set or lowered by turning the screws. When it is wished to lower the top-mast, a suitable purchase must be applied as usual to the top rope, which passes from the heel of the top-mast through the

pulley-block, suspended from the cap of the lower mast; the screws at the fid are then to be turned back until the fid–bar and top-mast are sufficiently lowered to slacken the rigging; the top-mast will then be suspended by the top rope, and the screws may be taken out, and the fid bar removed from out of the hole, when the mast may be struck. In raising the top-mast it is to be drawn up by the top rope until the fid or mortice hole is sufficiently above the tressel-trees, to allow of the introduction of the fid-bar, when the mast may be completely raised by turning in the screws.

Figs. 6 and 7, are representations of the heel of the top-mast, shewing the fid or mortice hole *g*, for the fid bar *a*, and also the hole for the common fid at *h*. The Patentees recommend, that when both fids are used, that the mortice hole of the common fid should be made somewhat angle ways across the heel of the mast, so that one end of the fid may project *before* one of the screws of the improved fid on one side of the mast, and the other end *behind* the screw on the other side. Wedges, &c. may be driven into the hole of the common fid, should the top-mast be raised (in order to tighten the rigging) higher than is necessary to insert it. When the old fid with the wedges are in the hole, the screws of the improved fid can be withdrawn entirely from the bar if wished, when the common fid will support the top-mast in the usual manner; the screws may at any time be used for setting up the top-mast, to take off pressure from the common fid.

The construction of the improved fid may be varied by making the bar *a*, so short, that its, ends will project only beyond the square of the heel of the top-mast; consequently the screws *b*, *b*, and their heads, must be placed in cavities in the mast, having sufficient space to apply the

levers to turn the screws round; the bar *a*, will, in this case, be fixed fast into the upper part of the fid-hole, and, to support the mast, a moveable cross bar of iron must be put through the lower part of the fid hole; the ends of this cross bar will rest on the tressel-trees; the upper side of this bar must have two cavities to receive the points of the screws, which will have their bearing on the cross bar. When the top-mast is lowered, this cross bar must be removed; but the bar *a*, and the screws *b*, *b*, will remain within the heel of the top-mast.

The Patentees state, that the first described construction of their improved fid is preferable; and that their invention may also be adapted to sliding bowsprits, by applying it in a horizontal, instead of a perpendicular position; and that their invention consists in the bar *a*, with the screws *b*, *b*, through each end thereof, constituting the improved fid, such bars and screws being applied in the manner hereinbefore described; and further, that they do not claim any other application of screws for supporting and raising or lowering top-masts and sliding bowsprits, or for slackening or tightening rigging, except when the screws are screwed through the two ends of the bar, as hereinbefore described.—[*Inrolled in the Inrolment Office, March,* 1831.]

To John Lee Stevens *auctioneer, and* Peter Waycott, *clock and watch maker, both of Plymouth, in the county of Devon, for their having invented certain improvements in mangles.*—[Sealed 22nd June, 1831.]

These improvements in the construction of mangles consists in two modes of lifting the mangle box, to

release the rollers from the pressure when it is wished to take them out of the mangle. Fig. 8, Plate XII. represents a mangle with one of these improvements; *a, a,* is the frame work and standards *b, b,* the bed; *c, c,* the box, pressing upon the rollers *d, d*; *e,* is the winch handle, by which the operator gives motion to the pinion, that takes into the rack *f.* This rack is formed on a bar of iron or other metal, extending from end to end of the mangle, supposing the pinion to be in gear with the upper side of this rack, it will cause the rack, and with it the box to be drawn one way through the frame, the rack and box being kept united by the pipe *g, g,* on the ends of the rack *f,* projecting outside of the guides *h, h*; on the pinion arriving at either extremity of the rack, it will be allowed to turn round the end, and be kept in gear with the underside of the rack by the guide.

The motion of the winch continuing the box and rack will be driven the reverse way through the frame, until the pinion reaches the other extremity of the rack, when it will be guided round the end and into gear with the upper side by the other guide piece and so on.

When the operation of mangling has been performed, it is necessary to relieve the rollers from the pressure of the box before they can be removed. These are constructed to do this in two ways: first, by connecting the end of the mangle box to be raised by a pin and chain to the shaft or axis of the winch handle, and as the shaft revolves, it coils up the chain round it and raises the box; second, by making the rack *f,* to act as a lever (like the beam of a steelyard) to raise the end of the box, the friction *k,* being the fulcrum. In the first of these modes of raising the end of the box, the pin *l,* in the upright standard *g,* must be removed from under the

rack *f*, at the end intended to be raised, as soon as the extremity of the rack arrives near to the pinion; the pin on the end of the short chain *m*, (see the section, fig. 9) fastened to the lid of the box, is to be placed through a hole on the shaft of the winch handle, which, as it continues to revolve, will coil the chain round it and raise the end of the mangle box, the slots between the standard guides *h, h*, allowing it to approach nearer to the rack. The click, or pall *n*, is then to be brought into contact with the teeth of the spur wheel, by which the end of the box will be kept suspended, the pall preventing the shaft from turning the reverse way to uncoil the chain; the rollers can now be removed and a fresh one substituted, and on removing the pall *n*, from out of the teeth of the wheel, the handle will be allowed to turn the reverse way, and the pin on the end of the chain will fall out of the hole in the shaft of the winch handle. The same operation is to be performed to raise the other end of the box, when the mangling may be continued. In the second mode, when the box is within the frame, the pin *o*, is to be taken out of the hole in the upright guides *h, h*, when that end of the rack may be depressed or allowed to descend, which it will do by its own gravity as the pinion approaches the other extremity of the rack.

The pin is then to be placed into the hole *i*, in the upright standard *h*, above the rack, as shewn in the fig. 9 when after the pinion has turned round the extremity of the rack, and is again proceeding towards the end to be raised, the weight of the reverse extremity of the rack will act as a lever, the friction roller *k*, being the fulcrum, and by its gravity raise the end of the box, taking the weight from off the roller, which can be removed and another one substituted. As the winch handle continues

to be turned, the end of the box will fall down again upon the roller, when the mangling may proceed, and after passing the centre, the ends of the rack *m*, will preponderate and fall away from under the pin *o*, which is now to be removed from out of the hole, and after the pinion has turned round the extremity of the rack, and again approached near to the end which has now been raised, the pin *o*, is to be placed into its former position under the bar as at *c*; after this operation has been performed at the reverse end of the mangle, the mangling may proceed without interruption.—[*Inrolled in the Rolls Chapel Office, August,* 1831.]

Specification drawn by Messrs. Newton and Berry.

To Barnard Henry Brook, *of Huddersfield, in the county of York, civil engineer, for his new invented improvements in the construction and setting of ovens, and retorts for carbonizing coal for the use of gas works.*—[Sealed 6th March, 1828.]

These improvements apply to the constructing and setting of iron retorts for distilling coal, that is, generating gas for illumination, and consist of two features; the first making the iron retort of two pieces, by which means when the upper part of the retort becomes injured or destroyed by the continued action of the fire, it may be replaced by a new top, and the bottom part of the retort may be retained in use; and secondly, the peculiar mode of setting such retorts, that is, mounting or fixing them in brick furnaces.

Plate XII, fig. 10, is a transverse section of one of these improved retorts set in its brick work; *a, a, a,* is

the bottom portion of the retort made of cast iron, slightly rising in the middle within, to give additional thickness and strength. On each side and end, a ledge rises, which is intended to enclose the descending ledges *b, b,* of the upper portion of the retort.

The two portions of the retort being put together as shewn in the figure, the rim of the ledge *b,* drops into a groove in the bottom plate *a,* and the two are united by cement, and become one vessel.

In erecting these retorts, an arch *c, c, c,* is made over the furnace *d,* with long apertures *e, e,* for the passage of the flame and heated vapour, which then comes in contact with the tiles *f, f,* that support the retort. These tiles are large slabs resting upon bearings of brickwork on the sides, and in the middle; and at the sides and back, apertures are made for the smoke and heat to pass to the flues and chimney.

The Patentee does not confine himself to any particular dimensions of retort, but lays his claim of invention to the construction of iron retorts for the generating of gas, in separate pieces, to be connected together by joints and cement as described, whatever may be their form or capacity, and in the mode of mounting retorts in brick work, as above shewn.—[*Inrolled in the Inrölment Office, September,* 1828.]

To James Chesterman, *of Sheffield, in the county of York, mechanic, for his having invented certain improvements on machines, or apparatus for measuring land and other purposes.*—[Sealed 14th July, 1829.]

The subject of this Patent professes to be an improvement upon the ordinary measuring tape, used by house and

timber surveyors; the object of which is to cause the tape to draw itself up into its box after having been extended, without the trouble of winding it in by a winch, as in the ordinary way.

The end of the tape instead of being fastened to the shaft of the winch, as in the ordinary construction, is affixed to a barrel within the box, which barrel contains a coiled spring, like the spring barrel of a clock or watch, and the tape winds itself upon the barrel exactly in the same way as a roller blind.

The strength of the spring within the barrel must necessarily be proportioned to the length of tape to be taken up. For a short tape it is only necessary to employ an ordinary spring barrel, in which the inner end of a convolute spring is fastened to a stationary axle, and the other or outer end of the spring to the moveable barrel. The tape fastened to the outside of the barrel on being extended (that is drawn out of the box), causes the barrel to turn, and the spring to be by that means coiled up to tension; and when the tape is let go, the recoil of the spring carries the barrel back again, and consequently draws in the tape and winds it round the barrel. But if the tape is of great length as of 50 feet or more, it will then be necessary to employ a rack and pinion in connection with the spring, which is proposed to be done in the following way:—

A concave rack or toothed rim is fixed to the edge of the barrel, and a small pinion to the moveable part of the spring: when on drawing out the tape, the rotation of the barrel causes the pinion to travel round it, and consequently to wind up the spring slowly. On letting go the tape, the force of the spring acting through the pinion upon the barrel, drives the barrel round rapidly, and causes the tape to be taken up upon the travelling barrel

with a speed much greater than that with which the spring acts.

In order to prevent the tape from running in when it is drawn out to any particular length, a small bolt on the edge of the box is projected forward, which, by pressing against the tape, holds it fast.

The Patentee claims the adaptation of the spring barrel to a tape box, for the purpose of winding up the tape as new, and also the bolt for stopping the tape.—[*Inrolled in the Inrolment Office, January,* 1830.]

To Charles Taverner Miller, *of Piccadilly, in the county of Middlesex, wax-chandler, for his invention of certain improvements in making or manufacturing candles.*—[Sealed February 4th, 1830.]

The object of this improvement is not stated in the specification, but the invention consists in applying a small glass tube to the wick of a wax or spermaceti candle. The cotton wick, prepared either in the common way or by platting, being passed into the mould, one of these small glass tubes is to be placed over it at the bottom of the mould, so that when the candle is made it may rest at the top of the candle; and becoming heated by the flame, when the candle is burning it gradually descends as the candle becomes consumed.

Tubes of three different diameters are proposed from about three sixteenths of an inch to three-eighths, to be used according to the size of the candle, or the material of which it is made.—[*Inrolled in the Inrolment Office, August,* 1830.]

To William Grisenthwaite, *of Nottingham, Esq. for his having invented certain improvements in steam engines.*—[Sealed 27th February, 1830.]

This invention is described as an improvement on Watt's steam wheel, that is, a rotatory steam engine. The description is extremely vague, and has no drawings accompanying it; indeed the whole presents the appearance of a collection of immatured ideas, with little if any novelty that we can discover.

The Patentee states that instead of employing mercury in the wheel (we presume for the steam stop), he proposes to introduce a block of iron mounted on anti-friction rollers, which shall slide round. Under some circumstances he would, instead of the circular rim of the wheel, adapt a series of vessels with pipes connecting one to the other; the pipe (for induction we suppose) entering each box on the side farthest from the centre, and the pipe for (eduction we suppose) coming out on that side which is nearest to the centre. This almost unintelligible description is all we can collect from the specification.

Something is said about a spiral wire gauze passed round the axle, and carried downwards to promote condensation; a tube as a chimney to promote draft; and a boiler formed by tubes with a float of stone or coke to "*filter out the heat.*" These matters are to us perfectly unintelligible, and if there is any feature of novelty or usefulness in the invention, it is much to be regretted that the Patentee did not employ some competent person to describe the invention in an intelligible manner.—[*Inrolled in the Inrolment Office, August,* 1830.]

To William Aitkin, *of Carron Vale, in that part of the United Kingdom called Scotland, Esq. for his having invented certain improvements in the means of keeping or preserving beer, ale, and other fermented liquors.*—[Sealed 30th March, 1830.]

The Patentee observes, that fermented liquors contain carbonic acid gas and spirits of alcohol, the former of which escapes from the liquor in froth, and the latter imperceptibly, when not confined; it is therefore necessary to keep beer, ale, and such fermented liquors close from the atmosphere, in air-tight casks or bottles; and if a portion of the liquor is drawn off, the vacant space in the cask or bottle ought to be filled up, to preserve the pressure upon the liquor, and prevent the escape of the carbonic acid gas and the spirituous vapour.

If the vessels which are designed to contain and keep beer, ale, and such fermented liquors were made cylindrical, it would be only necessary to introduce a plunger or piston, tightly packed with its rod, passing through the middle of the head of the cask, like the piston of a steam engine: and as the liquor was drawn out from below, to depress the piston which would fill up the space, and preserve the pressure; but as the casks for holding liquors are not made cylindrical, but bulging in the middle, other contrivances must be resorted to, which contrivances form the subjects of the present Patent.

To effect the object, it is proposed, whenever a portion of the fermented liquor is drawn off from the cask, to supply its place by injecting into the cask an equal quantity in bulk of carbonic acid gas, made from any of the cheap materials commonly employed for generating that gas. For the purpose of injecting the gas, a force pump may be employed.

In such situations as conveniently admit of it, bags may be filled with the gas, by placing them near the vat or vessel in a brewhouse in which fermentation is going on; the contents of which bags may be afterwards emptied into the casks. Under some circumstances, atmospheric air may be allowed to press upon the top of the liquor, if a float board is placed between to prevent the escape of the vapour.

A water-tight bag may be suspended within the cask, its mouth being passed through an aperture to the outside, when, as the liquor is drawn off, water may be poured into the bag to fill up the vacant space; or a descending column of water may be connected to the bag, which shall fill it as the liquor is drawn off.

A bag may be placed as a float in an open vessel on the surface of the liquor, and filled with water as last described, which will always keep the pressure tight and equal; and a gage, like the mercurial gage of a steam engine, may be applied to regulate the pressure.

In transferring liquors from one vessel to another, the one may be filled with carbonic acid gas, and portions of the gas let off into the other vessel as the liquor passes from it.

For the purpose of giving additional strength to casks holding fermented liquors, it is proposed to incase or inclose them in cast iron tanks. And, lastly, in order to draw off the sediment from beer or ale, which, if allowed to remain, tends greatly to injure the flavour of the liquor, it is proposed to form a conical recess, like a funnel, at the bottom of the cask, with a cock in its neck or narrow part, by means of which the sediment may from time to time be withdrawn as it accumulates.

From the employment of these inventions as a better means of keeping or preserving beer, the Patentee anti-

cipates so great an improvement in its quality, as to produce a vastly increased use of that beverage.—[*Inrolled in the Inrolment Office, October,* 1830.]

APPENDIX.

To the Report of the Select Committee of the House of Commons, on Patents.

Papers delivered in by John Farey, Esq.

[*British Law of Patents for Inventions.*]

(Continued from p. 301.)

Boulton and Watt against Bull in Chancery. Proceedings had been commenced in Chancery long before the above trial in the Common Pleas; and an Injunction had been issued to restrain Bull from infringing Watt's Patent until its validity could be tried at law. The Court of Common Pleas being equally divided in opinion on the above case, and no judgment given, application was made by Bull to the Court of Chancery to dissolve the Injunction. Heard 2d June, 1796, before Lord Loughborough. The Injunction was continued.

Lord Chancellor Loughborough: "I cannot put the patentees out of possession of their right upon the difference of opinion of the Court of Common Pleas, for that is not the fault of the patentees, and does not shake their right. The opinions of the Judges on both sides are deserving of great respect, but the verdict, though it has failed of effect, strongly supports the patent right, and is not to be disregarded. If nothing can be done upon it, there must be another action; and in the mean time the injunction must be continued. I will not put the patentees to compensation, or disturb the possession of their specific right." "It is of notoriety that Watt's fire-engines have been erected in many parts of the country with great advantage."

On the defendant's desiring that the action might be brought in the King's Bench, the Lord Chancellor said, "I will not lay them under any terms in bringing the action."

It appears from what was afterwards said by the Lord Chancellor, in Dilly v. Doig, that several other bills had been filed against other parties for violating Watt's patent.

This case was cited by Lord Chancellor Eldon in giving judgment respecting the Universities of Oxford and Cambridge v. Richardson in 1802: "If a party gets a patent, and puts his invention in execution, and has proceeded to a sale, that may be called possession under it, however doubtful it may be, whether the patent can be sustained; for possession under colour of a title, is ground enough to enjoin, and continue the injunction until it shall be proved at law, that it is only colour and not real title. Can it be said that Watt's patent right was not doubtful? The Court of Common Pleas were divided upon its validity. Upon the first argument in the Court of King's Bench they were inclined to hold it bad; but they altered their opinion, and decided in its favour. This court enjoined the infringers, all the time during the pendency of the law proceedings, on the ground that the patentees had possession of the invention, under colour of the title given by a patent, though questionable in that degree."—Vesey, jun. Reports in Chancery. v. 3, p. 140.

Hornblower and Maberley against Boulton and Watt. A Writ in Error in the Court of King's Bench against a Verdict given in the Common Pleas, for infringement of Mr. Watt's Patent of 1769, as extended by the Act 15 Geo. III. Judgment for the Patentee.

The Court of Common Pleas having been divided in opinion in a former case, the defendants in this case brought a writ of error; that the invention for which the patent was granted, was not any organized machine or manufacture, but mere principles only, for which no patent could by law be granted: it was argued twice in the King's Bench in 1798, and an unanimous judgment was given for the patentee, 25th January, 1799.

Lord Kenyon, Chief Justice: I am not one of those who greatly favour patents; for though in many instances (and particularly in this) the public are benefited by them, yet, on striking the balance, I think great oppression is thereby practised on inferior mechanics, by those who are more opulent. This patent, explained as it is by the specification, appears to be for a manufacture; the patentee claims a monopoly for an engine composed of material parts, which are to produce the effect described, and the mode of producing, is found by the jury to be so described, as to enable mechanics to construct it. I have no doubt in saying that this is a patent for a manufacture, which I understand to be something made by the hands of man.

Mr. Justice Ashurst: Every new invention is of importance to the wealth and convenience of the public; and when they are en-

joying the fruits of a useful discovery, it would be hard on the inventor to deprive him of his reward. The jury have found that the patentee has particularly described his invention, and I think he is in law, as well as in justice, entitled to the benefit which the patent and the Act of Parliament intended to confer on him.

Mr. Justice Grose: The patent and specification are so connected together as to make a part of each other; the patent grants to Mr. Watt the sole use of the method he invented, on condition of his disclosing the invention in the specification; he does so, and describes the principles of the method, and how those principles are to be carried into effect, and it seems to me that he does describe a new manufacture, by which his principle is realized. I do not consider it as a patent for the old engine, but only for the addition to, or improvement of, the old engine, and so the Act considers it. The patent does not claim the making of the old engine. A patent may be had for an addition to an old manufacture, the doubt thereof rests altogether upon Bircot's case, and I refer to what was said thereon in the Common Pleas.

The statute 15 Geo. III. must have a reasonable construction, to support, rather than defeat, the intention of the legislature; it recites the patent as a grant of the benefit of making certain engines invented by Mr. Watt, not the original fire-engines, but the improved ones; and the legislature considered it as a patent for the improvement described in the specification, not for a mere method, or for the original engine. A patent cannot be granted for a mere principle; but being granted for a method of making or doing any thing, and that mode being described, it becomes, in effect, a manufacture for the thing made, not merely for the principle upon which it is made. Where then is the mischief to the public, or how is the intention of the legislature defeated? Whether the patent stiles the the manufacture a method, or in any other manner, signifies nothing; the specification must be resorted to, and there I see that by pursuing the method pointed out, a manufacture is produced by the ingenuity of the inventor, and of which the public enjoy the fruit, and the author gets his monopoly for the term. It signifies nothing to either, whether the patent be for the engine as made, or for the method of making it, if that method be sufficiently described.

Mr. Justice Lawrence: According to the recital in the Act 15 Geo. III. Mr. Watt obtained a patent for a mechanical contrivance for lessening the consumption of steam, &c.; the patent recites, that he invented a method of lessening, &c; the specification states, that the method consists in certain principles, as they are called, which are described. It is clear the legislature understood that the patent was for an engine, and the form of the

patent and specification do not contradict this. Engine and method mean the same thing, and may be the subject of a patent.—Method is placing several things in the most convenient order, but it may signify a contrivance or device; so may an engine, and therefore I think it may answer the word method. So principle may mean a mere elementary truth, but it may also mean constituent parts. In effect the specification is this; the contrivance by which I lessen the consumption of steam in fire engines consists in the following principles (that is, constituent or elementary parts) which principles are applicable to all fire-engines, for whatever purposes they may be used, and whatever may be their construction, by an alteration of, and addition to, parts which are common to all, and upon which their powers of working depend.

If the specification had been ever so comprehensive, the patent could not have extended to the whole engine so altered and improved; the patent is for an improvement and addition to old engines, known and in use, and I think is good. The word engine, in its popular sense, is some mechanical contrivance to effect that to which human strength, without such assistance, is unequal, but it may also signify device; that Mr. Watt used it in that sense, and that the legislature so understood it, is evident from the words engine and method being used as convertible terms; for such a contrivance a patent may be granted; it falls within the description of a manufacture. It seems to me that the specification has stated a definite alteration or addition, which may be made in all fire-engines, and that it describes the same with sufficient accuracy to enable a workman to make it; but that point the jury have decided.

Observation.—Mr. Watt's is the most striking case amongst that very few, where an inventor has been protected in his patent rights for an adequate length of time, to enable him to perfectly establish his invention, and consequently recompense himself from the use of it. The great perfection which Mr. Watt attained, and the very general use into which he brought his steam engines, for a great variety of applications, was entirely owing to that protection; and it is certain that the public would not have benefited any thing like so much, if his patent had not been prolonged by Parliament, or if it had been set aside at law, as it ought to have been according to the rules laid down in all other cases of patent rights.

The formal objections against his patent, act, and specification, were much stronger than those upon which many other patents have been declared void, and the deficiency of explanation in his specification was a substantial objection; for in fact the public were not put in possession of the invention by the specification; and in Messrs. Boulton and Watt's practice, they took every pre-

caution to conceal the internal structure of their engines, and their means of making them, and succeeded so far in such concealment, that those who began to make Mr. Watt's engines after the expiration of the patent right in 1800, made very defective engines, for want of knowledge of the proper interior structure, and proportions of the parts; and although great numbers were made, no tolerable engines could be obtained, except from Messrs. Boulton and Watt, during several years; and not until persons who had been brought up in their factory, had set up in business for themselves.

Messrs. Boulton and Watt realized large fortunes by the patent. In addition to their profits as engine makers, they took one-third of the annual savings in fuel, made by their engines, compared with Newcomen's atmospheric engines performing the same work; that produced them a great revenue from Cornwall, where coals are dear, and the engines for draining mines very large and numerous.

The steam engine is an invention from which this nation has derived immense wealth during the last century, and increasing means of wealth for the future. After the enunciation of the principle of action had been made by De Caus in 1615, and Papin in 1690, the real inventors of the engine have been Savery in 1698, Newcomen in 1612, Watt in 1769, Trevethick in 1802, Woolf in 1804, and Fulton in America in 1807. Of these, Mr. Watt is the only one amongst us, who derived any adequate advantage, or recompense for his labours. Mr. Woolf's failure of a recompense was entirely owing to the want of protection by an extension of his term; for his engines came into very general use in Cornwall soon after the expiration of his patent, in place of Mr. Watt's engines, and with such great advantages in economizing fuel, that Mr. Woolf would have been amply recompensed, if his term had been made as long as Mr, Watt's was.

The steam engine and the other great inventions which have contributed so much to the wealth of the nation in the last century, viz. Lord Dudley's smelting of iron by pit coal; and the spinning machinery of Hargreave, Arkwright, and Crumpton, have had a very close connection with each other, and are continually used in concert, mutually aiding and promoting each other. The steam engine is connected with almost every useful art.

The King against Boileau. A scire facias to repeal Boileau's patent of 1798, for a new manufacture of straw, into hats and bonnets. Tried in the King's Bench in 1799. The patent was cancelled and repealed.

In the case of Dilly against Doig in Chancery, it was decided

by Lord Thurlow in 1794, that separate bills must be filed upon every distinct invasion of a patent by different parties.

The plaintiff being proprietor of the copy-right of Entick's Dictionary, obtained an injunction to restrain defendant from selling a spurious edition, printed at Edinburgh. On application being afterwards made. in Nov. 1794, to extend the injunction to another party, who was also selling such books.

The Lord Chancellor Thurlow said, " The right against the different booksellers is not joint; there is no privity. If he against whom the injunction issued, had transferred the books, I would have followed them. I do not remember any case upon patent rights, in which a number of persons who have all been acting separately on distinct grounds, have been brought before this court as parties; but proceeding has always been against a particular defendant. In the case of Watt's patent, there were several bills filed in this court, not long ago. Motion refused.

Cartwright against Toplis. An action for infringement of Cartwright's patents of 1790 and 1792, for machines for combing wool. The patents right was established; it was prolonged by act 48 Geo. III. in 1801, which contains a clause, saving Toplis's patent of 1793; and also a certain agreement made between him and Cartwright in 1793.

J. and C. Cartwright against Amatt and another. An action for Infringement of Edmund Cartwright's Patents of 1790 and 1792, for machines for Combing Wool, alledged to be assigned to J. and C. Cartwright. Tried in the Common Pleas before Mr. Justice Rooke, 18th Nov. 1799.

The Plaintiffs were nonsuited, upon a supposed defect in the deed of assignment, which was in some degree conditional as to the actual time of conveying the right. At the time the assignment was made, the patentee had an action pending against Toplis for infringement, and therefore required to retain or reserve the patents for the prosecution of that action. Accordingly the deed of assignment contained a reservation of the right by the patentee, in trust for the benefit of the assignees, until that action should be determined, and stated that the patentee should then assign the patent; but no subsequent deed of assignment was made.

Mr. Justice Rooke thought on the trial that the assignees were not legally constituted, so as to be entitled to sue; but on motion being made to set aside this nonsuit, that Judge said, that on further consideration, he was convinced that the legal interest, became vested in the assignees, immediately on the determination of the suit that was pending when the assignment was made; the rest of the Court were of the same opinion.

The action was afterward tried in the Common Pleas, Easter Term, 1800, before Lord Chief Justice Eldon. Verdict for the patentee.

Lord Eldon remarked that patents were to be considered as bargains between the inventors and the public, to be judged of on the principle of keeping good faith, by making a fair disclosure of the invention, and to be construed as other bargains.

Note.—The terms of Mr. Cartwright's patents were extended 14 years, from 1801, by Act of Parliament, 41 Geo. III. c. 138. And in 1809 he had a Parliamentary reward of £10,000.

Rowntree against ——— An action for infringement of his Patent of 1798, for a method of applying Fire for heating Boilers, &c. Tried 3d November, 1800, in the Common Pleas before Lord Eldon. The Patentee nonsuited,

Because the Jury declared their opinion, from the evidence, that the specification was not sufficiently clear to enable an ordinary tradesman to put the invention in practice.

NOTICES OF NEW BOOKS, &c.

We perceive, Part. I. of a work, entitled "Richmond and its surrounding Scenery," has recently appeared, engraved by and under the direction of W. B. Cooke, from drawings by eminent artists, with descriptive letter-press by Mrs. Hofland. The representation of such delightful scenery, treated by such artists as those who are engaged in the present undertaking, connot fail to be favourably received by the public in general, as well as by the lovers and encouragers of the Fine Arts.

Mr. Britton has just published another valuable work, called "A Dictionary of the Architecture and Archæology of the Middle Ages." To those who have any taste for the beauties and varieties of architecture, this able publication, which will put them easily in possession of all the elements of what Mr. Britton has very aptly denominated "Christian Architecture," will be invaluable. It is singularly copious and interesting in its details.

Number XXIII. of the Family Library, presents us with a Tour through South Holland, embellished copiously with characteristic views by Colonel Batty. This volume at a glance, strikes

us as being quite worthy of the Family Library, though the ground traversed presents little of novelty.

Vol. XXI. of Dr. Lardner's Cabinet Cyclopædia just published, contains "Lives of eminent British Statesmen." It is a very delightful volume, and on a subject likely to increase in interest as it proceeds. The present volume contains the lives of Sir Thomas More, Wolsey, Cranmer, and Burleigh. All embody much information, and that of Burleigh is especially well written.

Literary and Scientific Miscelanea.

Silk Worms.—By some recent experiments which have been made in France, it appears that Silkworms may be entirely fed upon the leaf of the scorzonera, or viperes grass, and the silk will be little if at all inferior to that from worms fed upon mulberry leaves.

Hay.—In Russia it is usual to preserve the natural verdure of hay. As soon as the grass is cut, it is, without having been spread, formed into a rick, in the centre of which has been previously placed a kind of chimney, made of four rough planks. It seems that the heat of the fermentation evaporates by this chimney, and that the hay thus retains all its leaves, its colour, and its primitive flavor.

Bottoms of Ships.—The Spaniards cover the bottoms of their ships with a cement composed of lime recently slacked, and fish oil, made into a paste and laid on with a trowel. This cement hardens when in contact with salt water, and acquires great solidity. It is advisable, however, before putting on this cement, to apply the usual coat of pitch, and to wait until the latter becomes quite cold.

St. Mary-le-bone Institution.—We are much gratified by learning, from a prospectus recently issued, that this rich and populous quarter of the town is about to establish an Institution for the cultivation of science, literature, and the arts. It is intended to consist of reading rooms, and a library; to have weekly meetings,

where original papers will be read, and objects of vertu, &c. shewn: lectures, a museum, &c. &c. This establishment for the diffusion of useful knowledge has our best wishes.

Weeds.—The annoyance of grass or weeds springing up between the stones of pavement, and in gravel walks, &c. may be extirpated for years by watering with a solution of lime and sulphur in boiling water.

Gresham Prize Medal.—We understand that it is intended by the trustees of Gresham College, to establish an annual prize medal, for the best original composition in sacred vocal music. The words to be selected from the canonical Scriptures, the Liturgy of the Church of England, or the Apochrypha.

New and Improved Material for sculpture Casts.—For some years past the Societe' d'Encouragement of Arts in Paris, have offered a premium of six thousand francs, for the composition of a material for casts, to supersede Plaster of Paris. This premium was lately adjudged to Messrs. Bryan, and St. Leger. According to the report of M. Merimée, their composition consists of chalk, clay and flint calcined and ground. It hardens in the air, and even under water, is easily worked, takes with facility every possible impression, and if it does not set so quickly as Plaster of Paris, it is considerably more durable, and withstands the vicissitudes of the atmosphere for a great length of time.

Scientific Meeting at York.—This meeting is fixed for the 26th of September. Regulations similar to those of the German associations have been drawn up. The Society is to be called "The Society of the British Cultivators of Science," and to consists of patrons as well as authors. It is to deliberate with open doors in different towns, to hold no property, and to provide accommodation for foreigners.

Association for the General Encouragement of Literature.—At the last quarterly meeting of this association, which was but thinly attended, Lord Dover took the chair. His lordship referring to the engrossing character of the political measures now under public discussion, recommended an adjournment of procedings until the popular mind had become more settled; which, after some conversation, was adopted. Another meeting will probably take place about, or soon after Christmas. The

principle of the design is so excellent that we trust it may be fully matured and carried into effect, and be found ultimately beneficial in bringing forward to public notice, authors and works of merit, which are at present unknown to the literary world.

New Fossil Crustaceous Animal.—Professor Scouler, of Glasgow, describes in the last No. of the Edinburgh Geographical Journal, a very extraordinary fossil crustaceous animal, under the name of Eidothea, it bearing a remarkable similarity to the human skull. The shell is entire and exhibits no vestiges of any division, it has a tail consisting of several articulations. The eyes are placed on short pedicles.

Medal Engraving.—A Society for the encouragement of Medal Engraving in Great Britain is about to be formed. It is to consist of an unlimited number of members, at a small annual subscription; its object being solely to promote and encourage the art of Medal Engraving, by publishing continually medals commemorative of eminent men, or remarkable events, and employing none but native artists to execute them.

Schools in Greece.—Though the internal administration of the new Grecian state has hitherto been prevented, by the want of proper teachers, and the requisite funds for establishing an adequate number of public schools for the instruction of youth, it has nevertheless succeeded in founding elementary schools in the principal district towns. Unremitting exertions are making in the different provinces to obtain collections of pecuniary and other resources for the establishment of public schools; and, besides those already in operation, the building of twenty new ones has been commenced and will soon be completed.

New Island.—*The Semaphore,* of Marseilles, states, on the authority of the Captain of a brig, sailing between Trafani and Girgenti, that an island was formed by a volcanic eruption in the middle of July, in that part of the Mediterranean. The phenomena are represented as very striking. An immense mass of water was thrown up to the height of sixty feet, accompanied by a sulphurious smoke and a great noise. The result of the submarine explosion is an island in 37° 6' North lat. and 10° 26' East long. from the meridian of Paris.

It is an active volcano, with a crater in its centre, whence lava flows. The sea all around is a hundred fathoms deep.

List of Patents

Granted by the French Government, from January to March, 31, 1831.

To Mr. John Meares, of London, (represented in Paris by A. Perpigna, French and Foreign patent agent, Rue Nuve, St. Augustin, 28) for an improved machine for mowing grass. 5 years.

— Charles Flount, Chrysorsome Masaille, Paris, for a portable fire-place or stove. 5 years.

— William Cooper, (represented in Paris by Perpigna), for an improved apparatus for the generation and application of heat. 15 years.

— John Goulding, of Derham, (represented in Paris by Perpigna), for improvements on his patent of fifteen years, taken out for new machinery for carding and spinning wool, cotton, and other fibrous substances.

— Charles Frederic Johnson, (represented in Paris by Perpigna), for an improved coffee-mill. 5 years.

— Benjamin Jolliret, Paris, for an improved method of fastening tags on stay-laces. 5 years.

— Guigo, engineer, Lyons, for a fourth patent for improvements on the original patent granted to him for a new loom for weaving, which stops when the thread breaks.

— Louis Serbat, Paris, for improvements on the 15 years patent granted to him, for a new method of manufacturing animal charcoal

— M. Henri Pape, piano-maker, Paris, for spring castors. 5 years.

— William Kent, London, (represented by Perpigna), for improvements in the fabrication of brushes. 10 years.

— Robert Graham, London, (represented by Perpigna), for improvements in machinery for extracting molasses frpm cane or beet sugar. 15 years.

— Scriber and Louis, Paris, for a new kind of gentlemen's stocks made of chamois leather. 5 years.

— Tales Minette and I. B. Chardot, Paris, for a machine to bruise and grind pulverable and fibrous substances. 10 years.

— John Goulding, of Derham, (represented by Perpigna) for improvements in self-acting looms for weaving woollen or other cloth. 15 years.

— Pierre Cartereau, Paris, an economical oven for baking bricks, tiles, &c. 15 years.

— Sirheuri (Charles Louis), for an instrument of surgery called lithonthriptic. 5 years.

— Pierre Alexandre Lemare, Paris, for improvements on his ten years patent, for a culinary apparatus.

To Antoine Galy Caralat, Versailles, improvements on his 19 years patent, for new steam engines applicable to steam boats.

— Nicholas Morel, Paris, improvements on his 19 years patent, for destroying, by fumigation, moths and other insects.

— John Byrne, Moidden, Passy, for an economical dragging-machine. 5 years.

— James Irving, of London, for a combination of substances for manufacturing hats. 10 years.

— Jean Baptiste, Benjamin, Laigne, Paris, improvements on his five years patent, for warming carriages in winter.

— Menessir and Targer, Paris, for a new liquor called gerambing. 15 years.

— Abraham Emmanuel Jaccond, Vienna, improvements on his ten years patent, for a method of preserving in the stocks of wheels and around the axletrees, the oil used to grease them.

— François Xavier, Saint Etienne, Paris, a new machine for extracting and manufacturing potatoe starch 10 years.

— Cuissard, Bernard Mitois, and Co. Nantes, for a cylindrical steam boiler. 5 years.

— Antoine Joseph Vincent Gros, Paris, a method of painting on horse-hair cloth. 5 years.

— Maximilien Frank, Paris, for a new guitar. 5 years.

— Edwin Clayton, Nottingham, (represented by Perpigna), a new kneading machine. 5 years.

— Charles Frederick Johnson, (represented by Perpigna), a new system of carding wool, cotton, &c. by a continued movement. 10 years.

— Lèonard Sarrozin and Pierre Derayre, Bourdeaux, a new mill for grinding wheat. 15 years.

— Andrè Kæchlin and Co. Mulhausen, a new method of spinning by a continued movement cotton, wool, &c. 5 years.

— Ormond Théodore Santerre, Paris, for an apparatus for evaporating liquids. 15 years.

— Daudé and Béraut, Paris, inprovements on their five years patent for mechanical busks for stays.

— Louis Edward Fleulard, Paris, for a machine called "pantriteur." 5 years.

— P. T. B. V. Gosset, Havre, for a new night lamp, called "serrante denuit." 5 years.

— Joseph Mennel, Paris, for improvements on his 19 years patent for a new kind of liquid soap.

— Thonneleir and Manceaux, Paris, for an improved method of manufacturing gun barrels. 19 years.

— Ferry Jugeneer Vorges, for additions to his 5 years patent granted for certain improvements on the portable weighing machine of Quinteuz.

New Patents Sealed, 1831.

To William Allen, of Catherine Street, Strand, in the county of Middlesex, piano forte maker, for his having found out and discovered certain improvements upon piano fortes.—20th July, 2 months.

To Henry Lister Maw, of South Molton Street, in the county of Middlesex, Lieutenant in our Royal Navy, for his having invented or found out an improved method of using fuel, so as to burn smoke.—20th July, 6 months.

To John Bance, of Moscow Cottages, Bayswater, in the parish of Paddington, and the county of Middlesex, gentleman, in consequence of a communication made to him by a foreigner residing abroad, for an invention of an improvement in the construction of heads or hoods for cabriolets, gigs, or other open carriages, whereof the heads or hoods are required to fold down behind the back of these at when out of use.—27th July, 2 months.

To John Young, of Wolverhampton, in the county of Stafford, locksmith, for his having invented certain improvements on locks and latches, with regard to the security of the same, and the construction of the interior and exterior parts thereof.—27th July, 6 months.

To Marmaduke Robinson, of Great George Street, in the city of Westminster, navy agent, on behalf of William Augustus Archbald, Esq. a lieutenant in the Royal Navy, at present residing at Louisiana, in the United States of America, in consequence of a communication made to him by the said William Augustus Archbald, for certain im-

provements in the making and purifying of sugars.—27th July, 6 months.

To William Church, of Heywood House, Bordsley Green, Birmingham, in the county of Warwick, gentleman, for his having invented or found out certain improvements in machinery for making nails.—27th July, 6 months.

To Anger March Perkins, of Harpur Street, in the county of Middlesex, civil engineer, for his having invented certain improvements in the apparatus or method of heating air in buildings, heating and evaporating fluid, and heating metals.—30th July, 6 months.

To Sir James Caleb Anderson, of Bulevant Castle, in the county of Cork, Ireland, baronet, for his having invented certain improved machinery for propelling vessels on water, which machinery is applicable to other useful purposes.—2nd August, 6 months.

To John Hall the Younger, of Dartford, in the county of Kent, engineer, in consequence of a communication from a certain foreigner residing abroad, for an improvement in machinery used in the manufacture of paper.—3rd August, 6 months.

To Jean Marie Etienne Ardit, of Newman Street, Oxford Street, in the county of Middlesex, printer, in consequence of a communication made to him by a certain foreigner residing abroad, for a machine or apparatus for drawing, and for copying, and reducing drawings, and other objects or subjects, and for taking panoramas.—10th August, 2 months.

To Alexander Cochrane of Norton Street, Great Portland Street, in the county of Midelesex, Esq. for his having invented certain improvements in machinery for propelling or moving locomotive carriages, and giving

motion to mills, and other machinery.—10th August, 6 months.

To William Mason, of Margaret Street, Cavendish Square, in the county of Middlesex, patent axle tree maker, for his having invented certain improvements in the construction of wheeled carriages.—10th August, 6 months.

To David Selden, of Liverpool, in the county Palatine of Lancaster, merchant, in consequence of a communication made to him by a foreigner residing abroad, for an invention of certain improvements in metallic mills for grinding coffee, corn, drugs, paints, and various other materials.—11th August, 6 months.

To Augustus Whiting Gillet, of Birmingham, in the county of Warwick, merchant, in consequence of a communication made to him by a foreigner residing abroad, for an invention of a new or improved machine or instrument to measure, beat, and give the accents in all the different moods of time with any degree of velocity required, applicable to the teaching of music.—13th August, 6 months.

CELESTIAL PHENOMENA, FOR SEPTEMBER, 1831.

D.	H.	M.	S.	
1	0	0	0	☉ before the Clock 1 sec.
2	1	0	0	♂ in conj. with σ in Taurus
3	16	0	0	♅ in conj. with δ in Capri
4	17	0	0	☾ in conj. with α in Leo
5	0	0	0	Clock before the ☉ 1 m. 15s.
5	4	0	0	☾ in conj. with ⚳ in Leo.
5	9	0	0	☾ in conj. with ♄ long. 3, in Leo, ☾ lat. 1 20 N. ♄ lat. 1 33 N. diff. of lat. 13
5	20	33	0	Ecliptic conj. or ● new moon
7	17	0	0	☽ in conj. with 1 γ in Virgo
10	0	0	0	Clock before the ☉ 2 min. 55 sec.
11	8	0	0	☽ in conj. with ⚴ in Libra
11	20	0	0	☽ in conj. with ⚴ in Libra
12	12	0	0	♂ in conj. with φ in Oph
13	0	0	0	☿ Stationary
13	16	42	0	☽ in □ first quarter
14	16	0	0	♂ in conj. with β in Virgo
15	0	0	0	Clock before the ☉ 4 min. 40 sec.
15	20	0	0	☽ in conj. with d in Sagitt
17	0	0	0	♀ Stationary
20	0	0	0	Clock before the ☉ 6 min. 25 sec.
20	0	0	0	☽ in conj. with λ in Aquarius
20	10	0	0	☽ in conj. with φ in Aquarius
21	9	55	0	Eclip. oppon. or ○ full moon
23	5	0	0	☾ in conj. with ν in Pisces
23	7	46	0	☉ enters Libra
24	1	0	0	☾ in conj. with ξ in Ceti
24	8	0	0	☾ in conj. with μ in Ceti
25	0	0	0	Clock before the ☉ 8 min. 10 sec.
25	4	0	0	☾ in conj. with f in Taurus
26	0	0	0	☾ in conj. with γ in Taurus
26	1	0	0	☾ in conj. with 1 θ in Taurus
26	2	0	0	☾ in conj. with 2 θ in Taurus
26	7	0	0	☾ in conj. with α in Taurus
27	3	0	0	♂ in conj. with η in Virgo
28	4	0	0	☾ in conj. with ν in Gemini
28	4	28	0	☾ in □ last quarter
28	18	0	0	☾ in conj. with ζ in Gemini
30	0	0	0	Clock before the ☉ 9 min. 50 sec.

J. LEWTHWAITE

Rotherhithe.

The waxing moon ☽.—the waning moon ☾

Meteorological Journal, 1831.

1831.	Thermo. Hig.	Thermo. Low	Barometer. High.	Barometer. Low.	Rain in inches.	1831.	Thermo. Hig.	Thermo. Low	Barometer. Hig.	Barometer. Low.	Rain in inches.
JULY 26	80	46	30,14	30,09		AUG. 10	71	52	22,99	29,94	,2
27	82	45	30,16	30,13		11	75	49	30,09	30,00	
28	80	55	30,10	30,09		12	76	46	30,08	30,05	
29	82	51	30,08	30,05		13	74	49	30,00	29,97	
30	81	50	30,12	30,11	,35	14	76	46	29,95	Stat.	
31	81	52	30,10	30,04		15	73	44	30,03	30,01	
AUG.						16	74	44	30,07	30,05	
1	75	51	30,01	29,87		17	75	50	30,00	29,91	,025
2	75	50	29,83	Stat.		18	78	47	29,89	29,75	
3	72	60	29,84	29,82	,5	19	72	48	29,66	29,65	,05
4	75	54	29,76	29,73	,35	20	69	52	29,82	29,67	.05
5	75	51	29,74	29,64	0,25	21	69	53	30,15	30,02	,1
6	75	54	29,68	29,64		22	69	50	30,21	30,16	,025
7	76	57	29,68	29,64		23	76	53	30,09	30,02	
8	79	51	29,84	29,76	,15	24	73	53	29,92	29,72	
9	78	59	29,89	Stat.		25	70	52	29,78	29,64	,025

Edmonton. *Charles Henry Adams.*

Latitude 51, 37, 32, N.
Longitude 3, 51, West of Greenwich.

LIST OF PLATES IN VOL. VII.

SECOND SERIES.

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TO THE SEVENTH VOLUME.

REPORT OF RECENT PATENTS.

LONDON:
GUTHRIE, PRINTER, SHOE LANE, FLEET STREET.

X-

Mr. L. W. Wright's Plan for Filtering River Water.

Fig. 1.

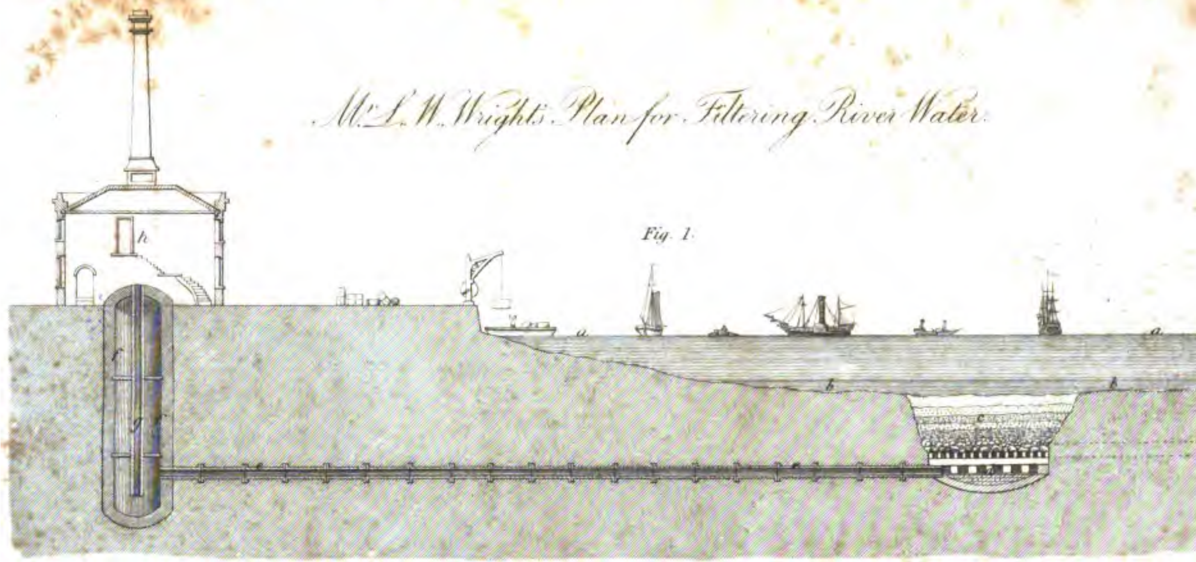
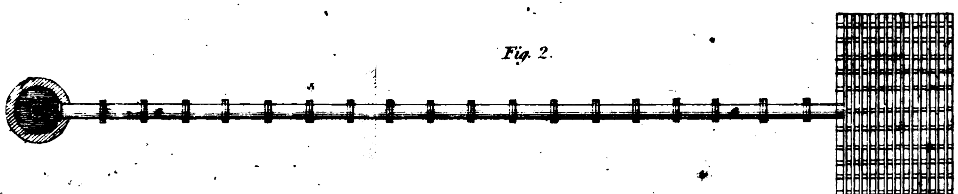
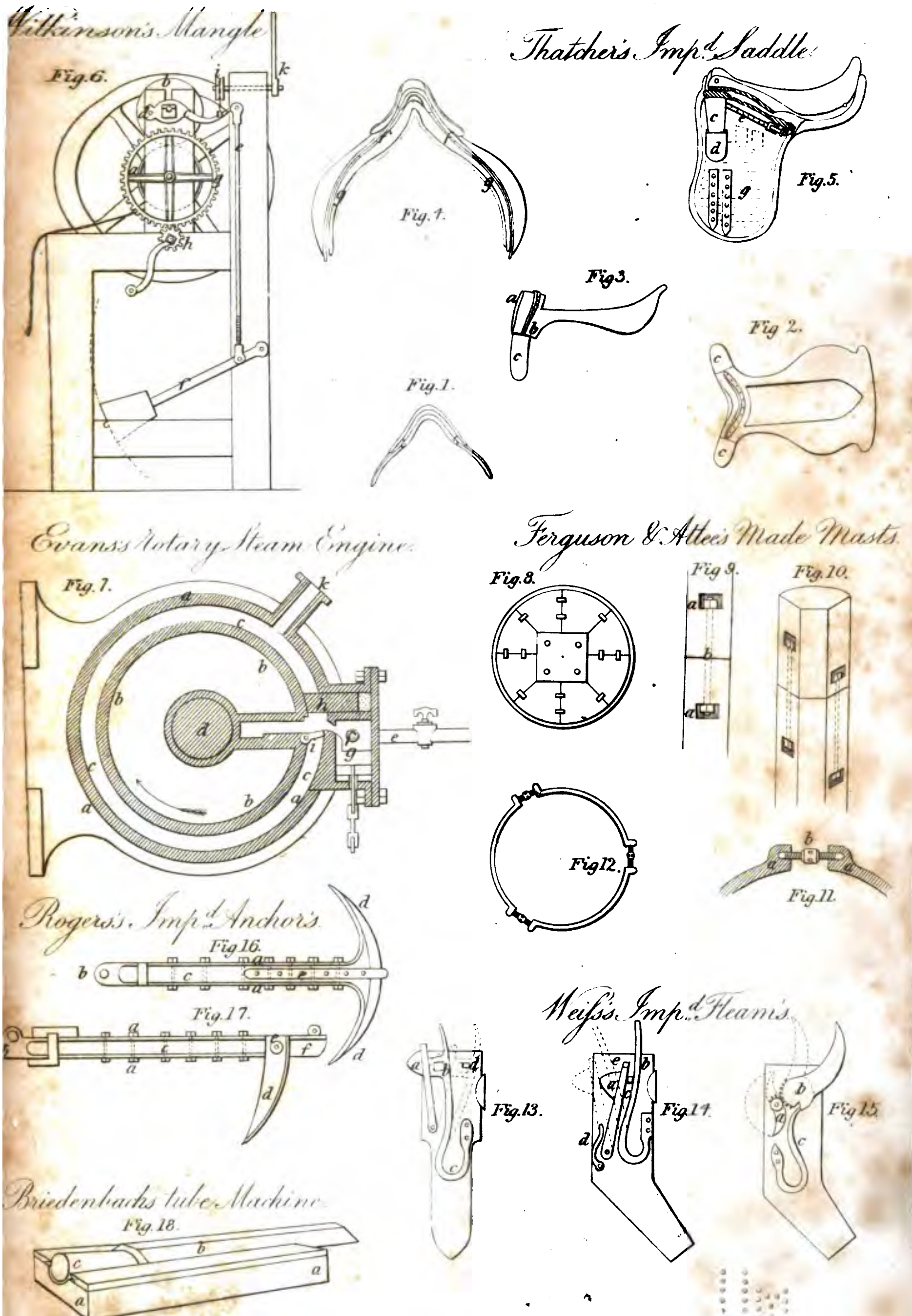


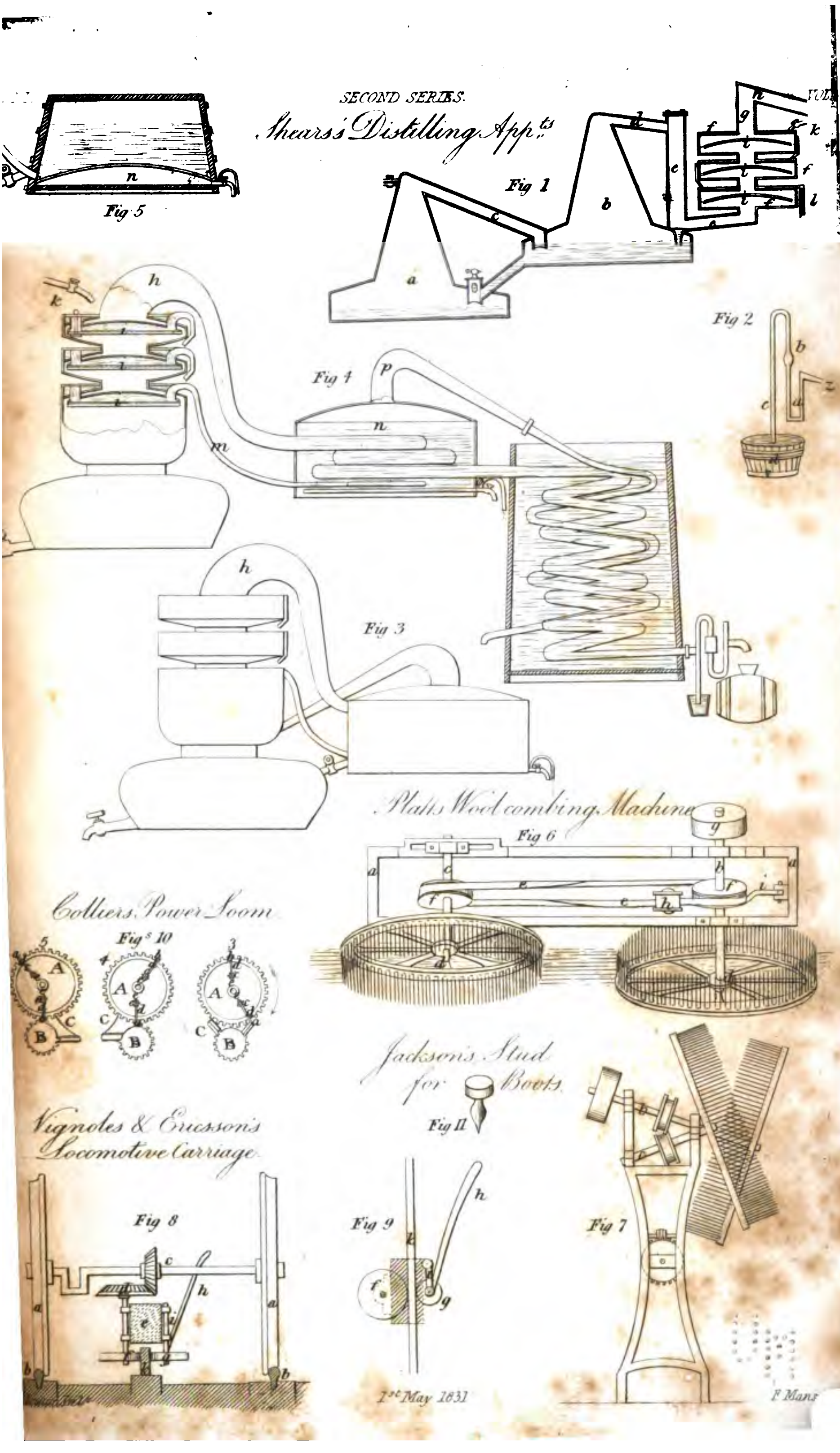
Fig. 2.



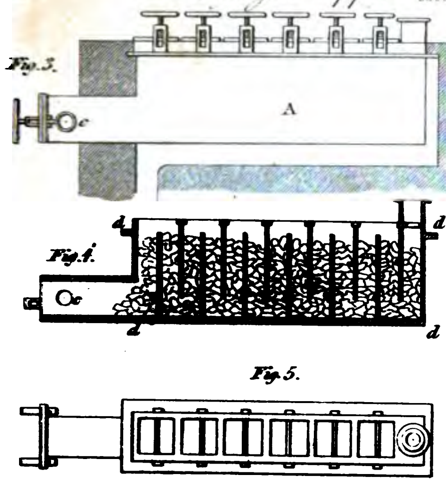
W. Newton del. 1st April 1831. T. Phillibrown sc.

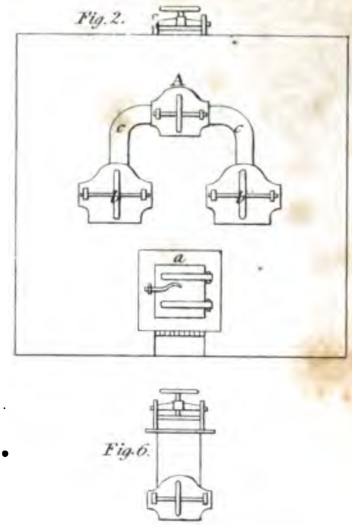


W.Newton Delt. 1st April 1831. F.Mansel Sc.

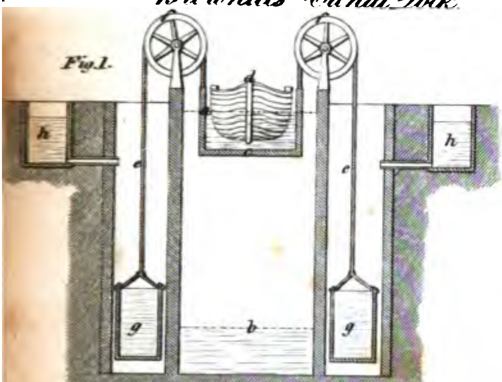

SECOND SERIES.
Shears's Distilling App.ts
Fig 1
Fig 2
Fig 3
Fig 4
Fig 5
Platts Wool combing Machine
Fig 6
Colliers Power Loom
Figs 10
Jackson's Stud for Boots
Fig 11
Vignoles & Ericsson's Locomotive Carriage
Fig 8
Fig 9
Fig 7
1st May 1831
F Mans

Down's Gas Appts.

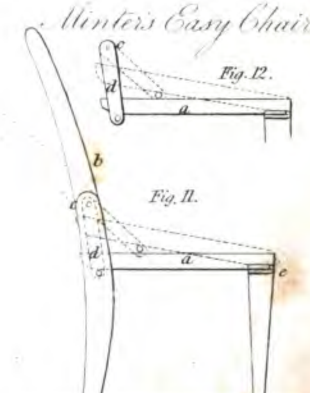




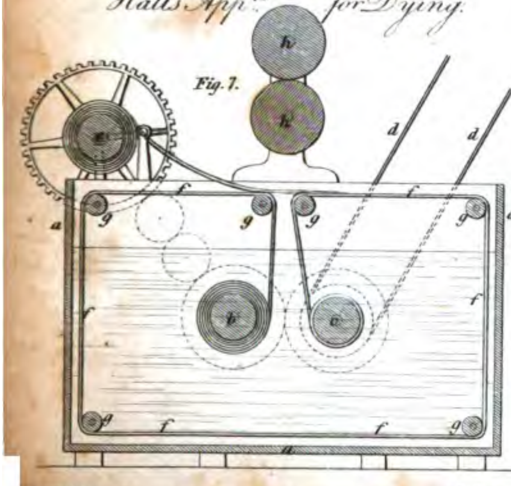
Brownill's Canal Lock.



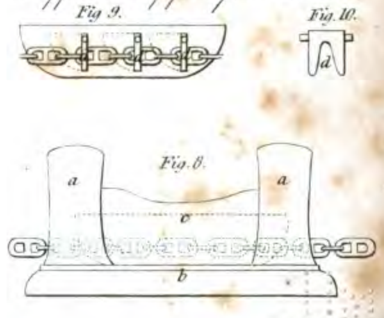
Minter's Easy Chair.



Hall's Appts. for Dying.

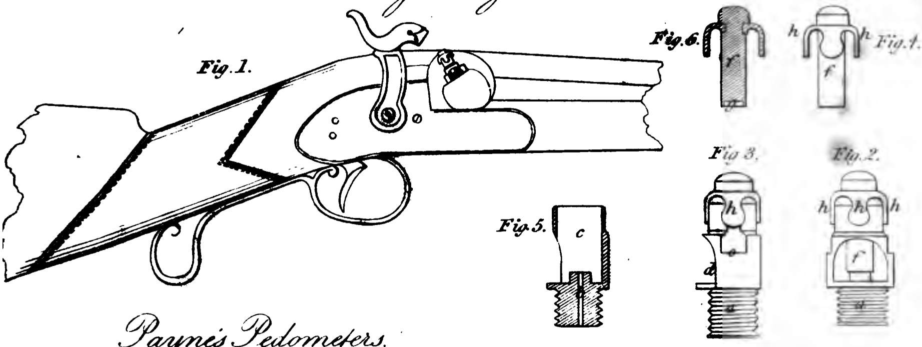


Moffat's stopper for Cables.

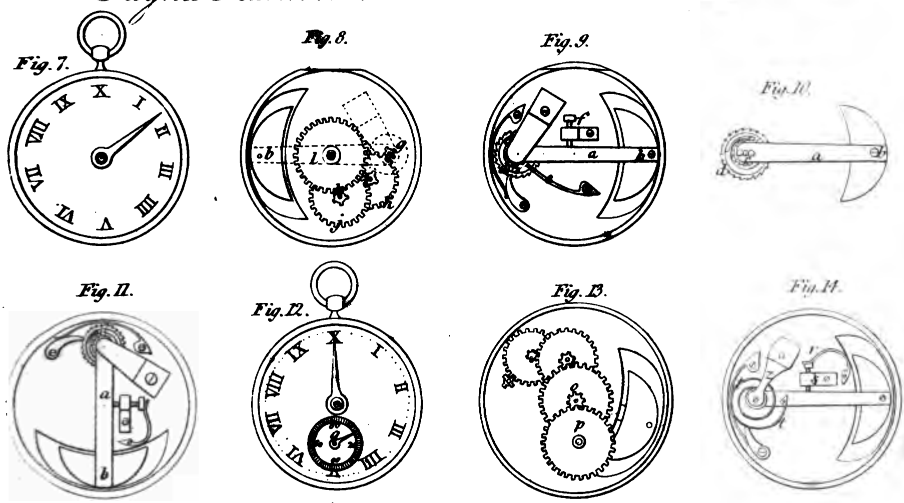


Newton del. 1st June 1837. F. Mansell sc.

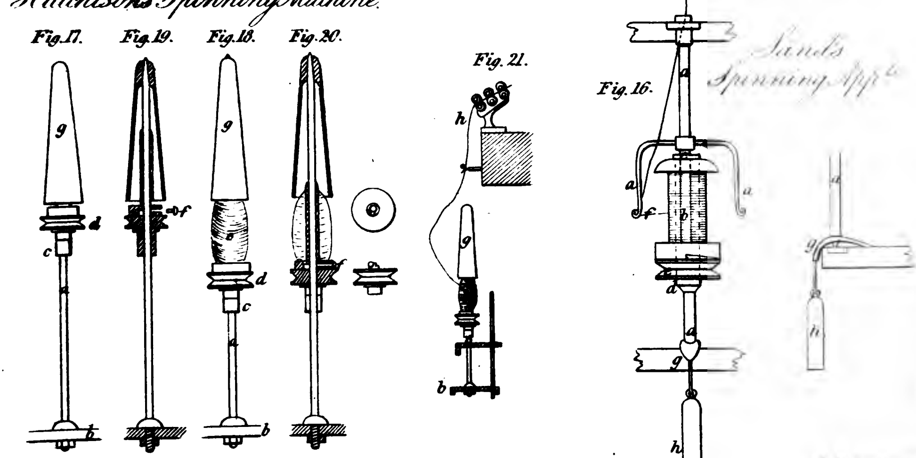
Richards's Percussion Gun Lock.



Payne's Pedometers.



Hutchison's Spinning Machine.



W. I. Newton del.t June 1st 1831

SECOND SERIES.

Church's Imp.d Steam Engines.

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Fig. 1.

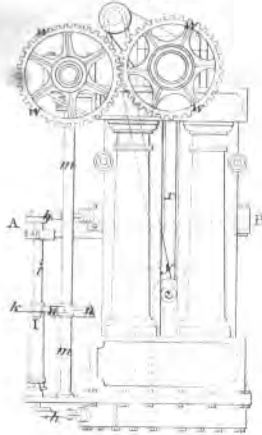
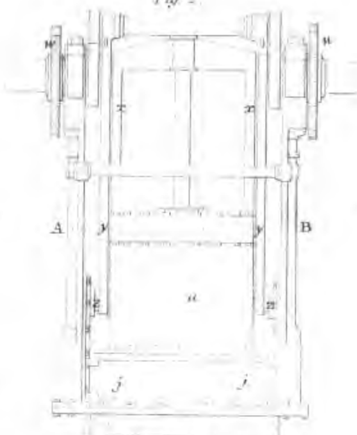


Fig. 2.



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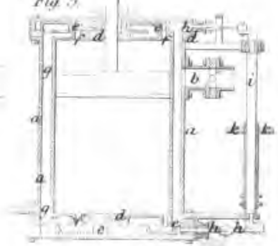


Fig. 6.

Fig. 7.

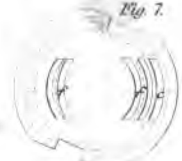


Fig. 8.

Fig. 9.

Fig. 10.

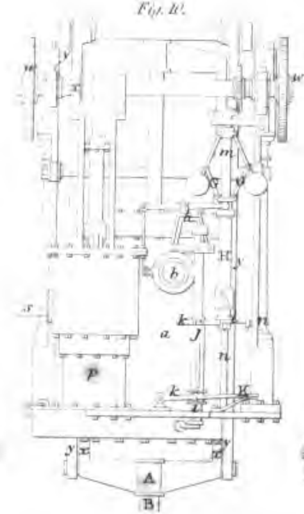
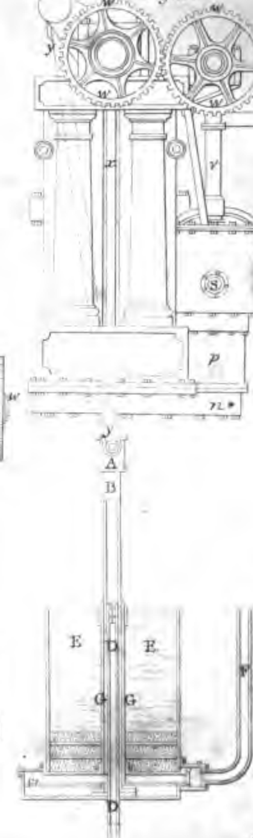


Fig. 11.



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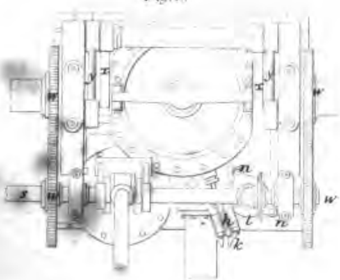
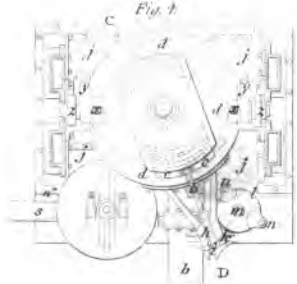


Fig. 4.

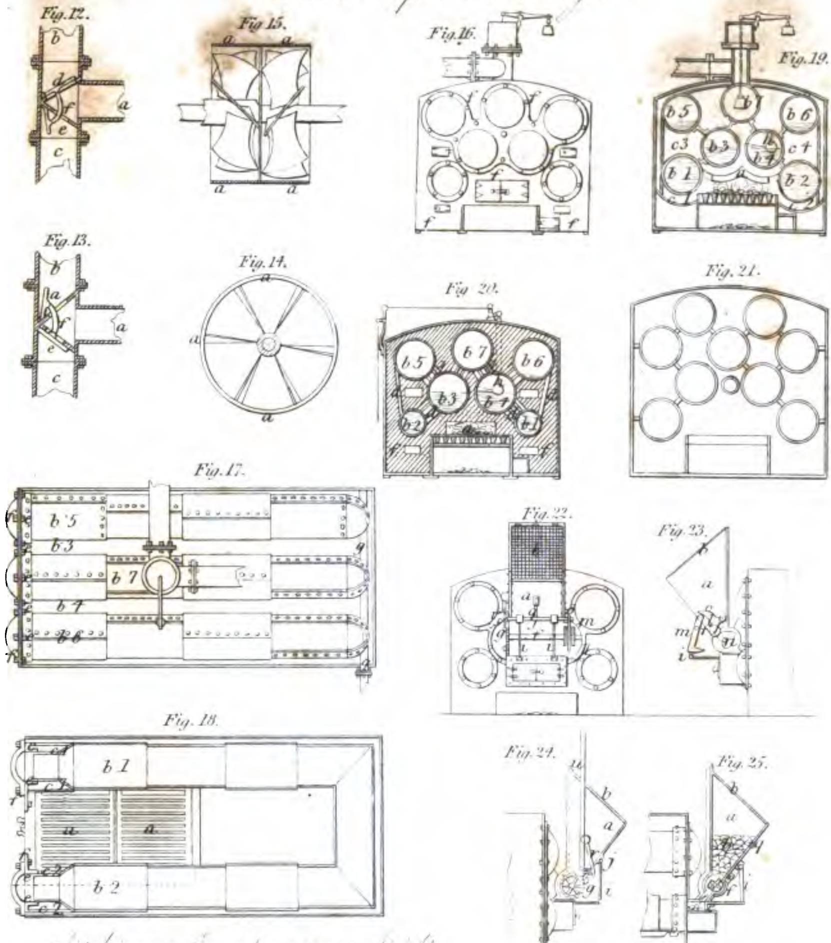


Newton del.t

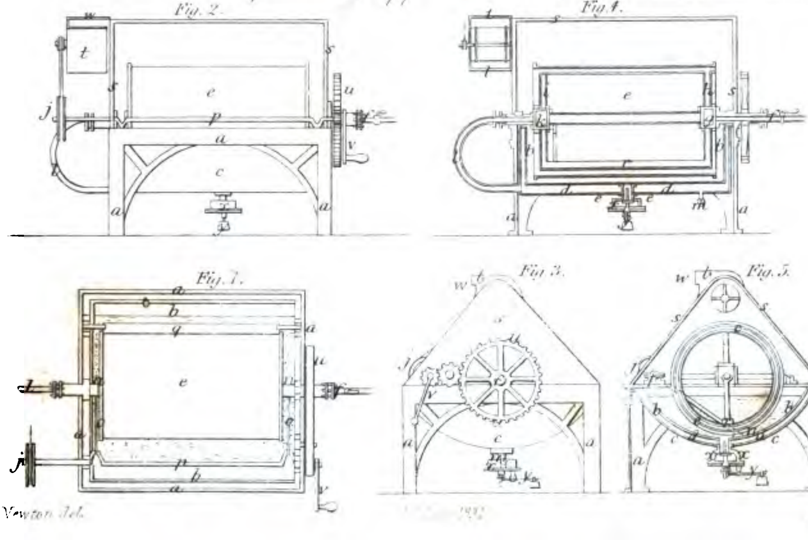
1.st July 1832.

G. Gladwin sc.

Church's Impd Steam Engine.



Aitchison's Evaporating Appts.



Cochrane's Cooking Apparatus.

Hopper's Impts. in Shearing Cloth.

Fig. 8.

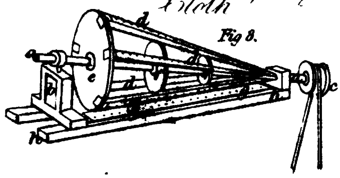
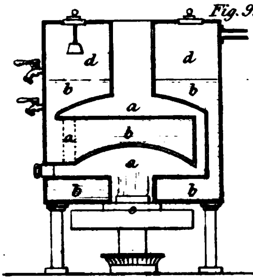


Fig. 9.



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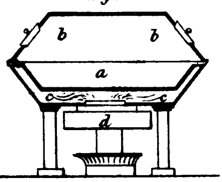


Perkins's Impts. in propelling.

Fig. 7.

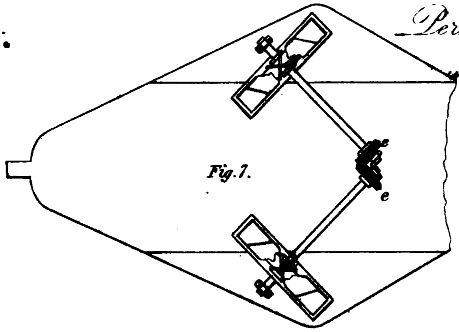
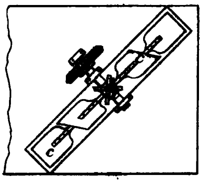


Fig. 6.



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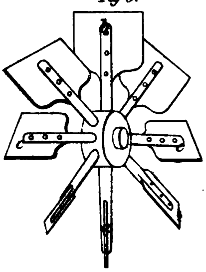
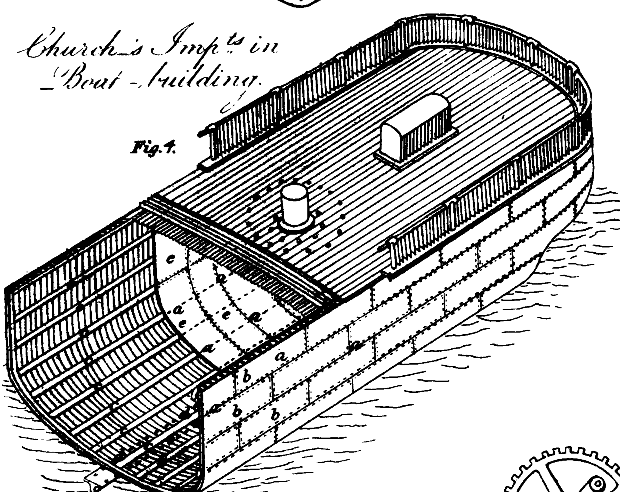


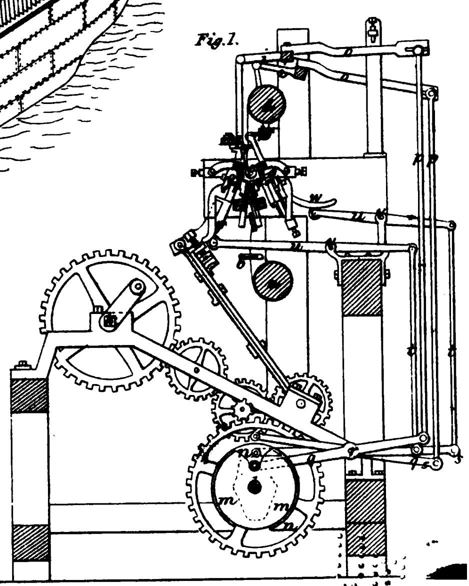
Church's Impts. in Boat-building.

Fig. 4.



Lever's Impd. Lace Machine.

Fig. 1.



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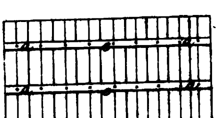

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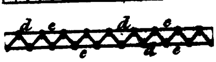
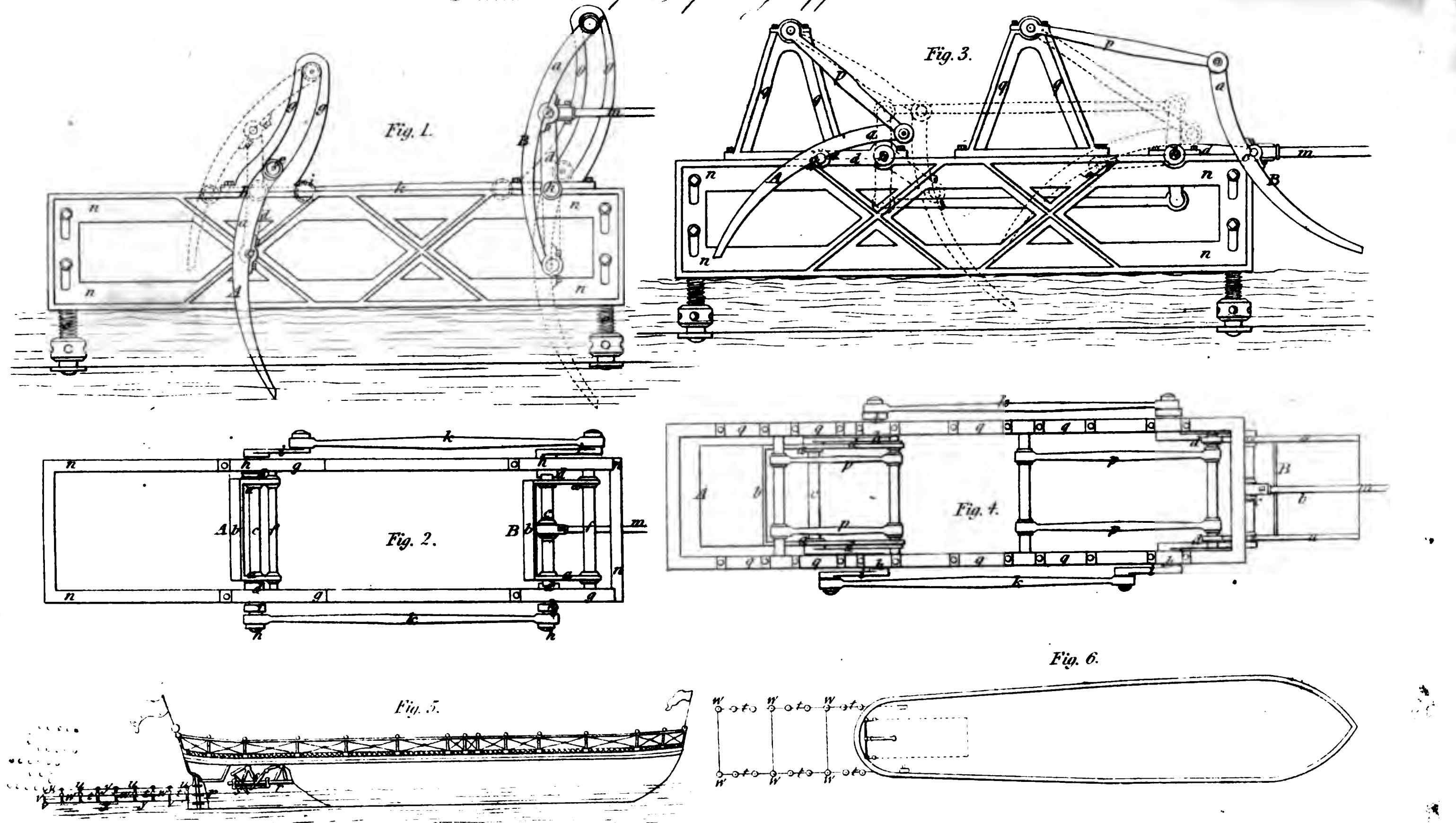
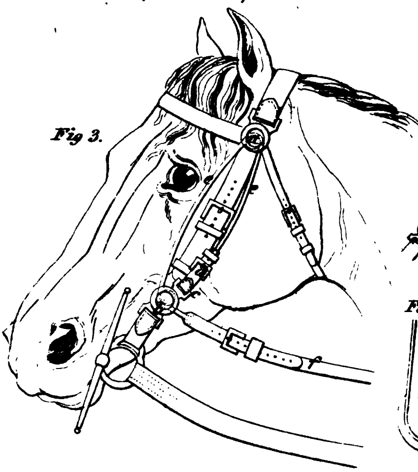


Smith's Impd. Propelling Apparatus



W. Newton del. 1st Septr. 1832. E. Mansell sc.

Phillips's Impd. Bridle.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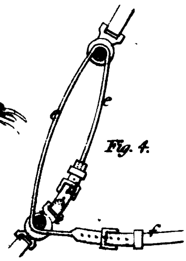


Fig. 4.

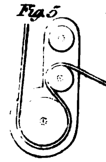


Fig. 5

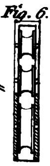


Fig. 6.

Smith's Impd. Chimnies.

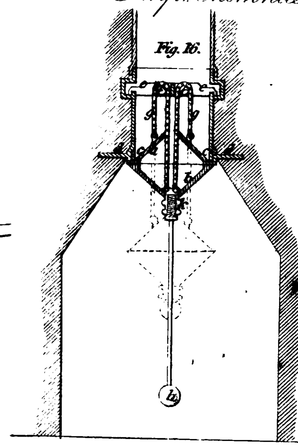
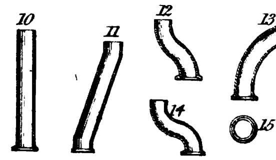


Fig. 16.

Figures.


10 11 12 13 14 15

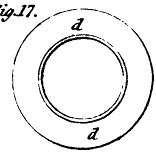


Fig. 17.

Dunn's Impd. Boiler.

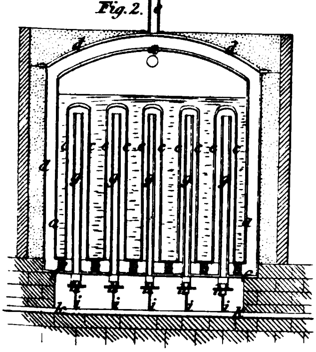


Fig. 2.

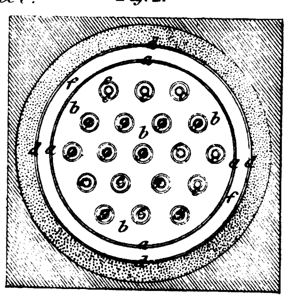


Fig. 1.

Perry's Impd. Pens.

Fig. 18.

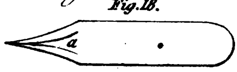
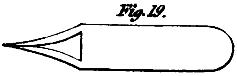


Fig. 19.



Palmer's Excavating Machine.

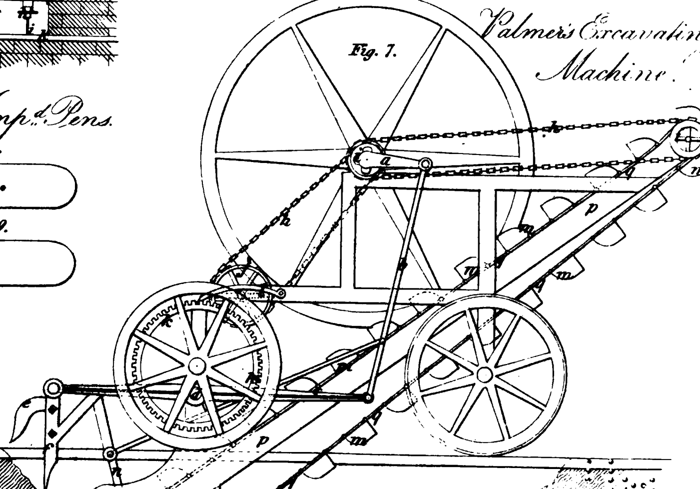


Fig. 7.

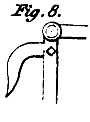


Fig. 8.


Fig. 9.

W. Newton del. 1st Sept. 1831. T. Phillibro

Coffey's Imp.d Distilling Apparatus.

Fig. 2.

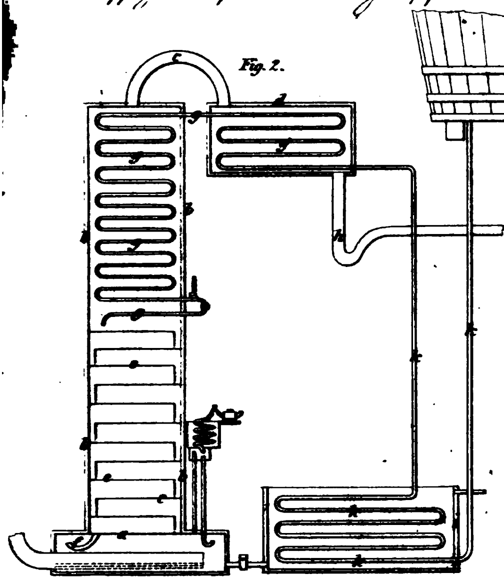
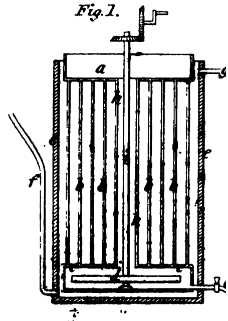


Fig. 1.



Pearce's Imp.d Fid.

Fig. 6.

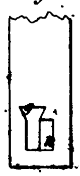
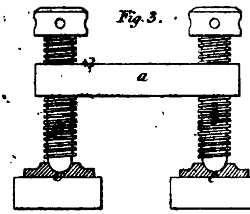


Fig. 7.

Fig. 3.



Brook's Retorts.

Fig. 10.

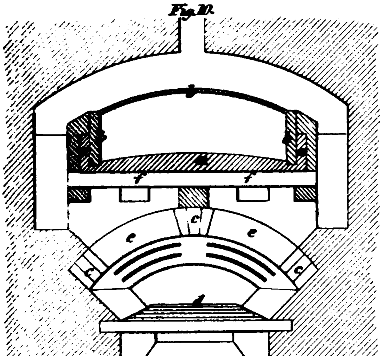
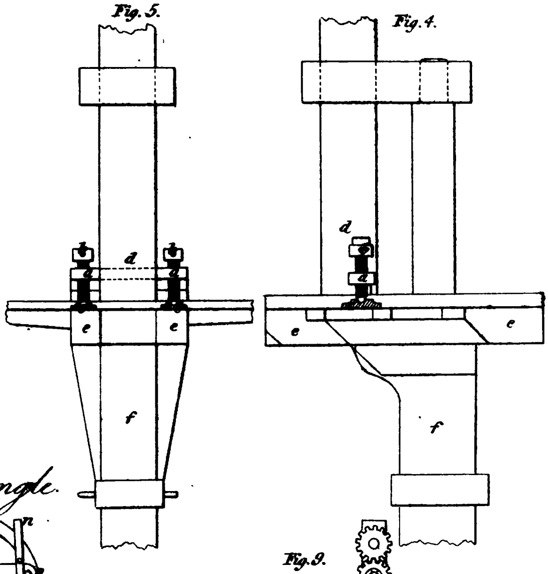


Fig. 5.

Fig. 4.



Steven's & Waycott's Imp.d Mangle.

Fig. 8.

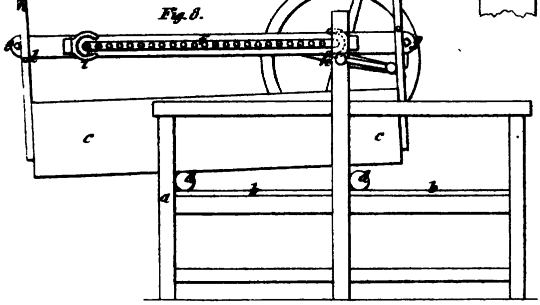


Fig. 9.